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PROGRAM MANAGER

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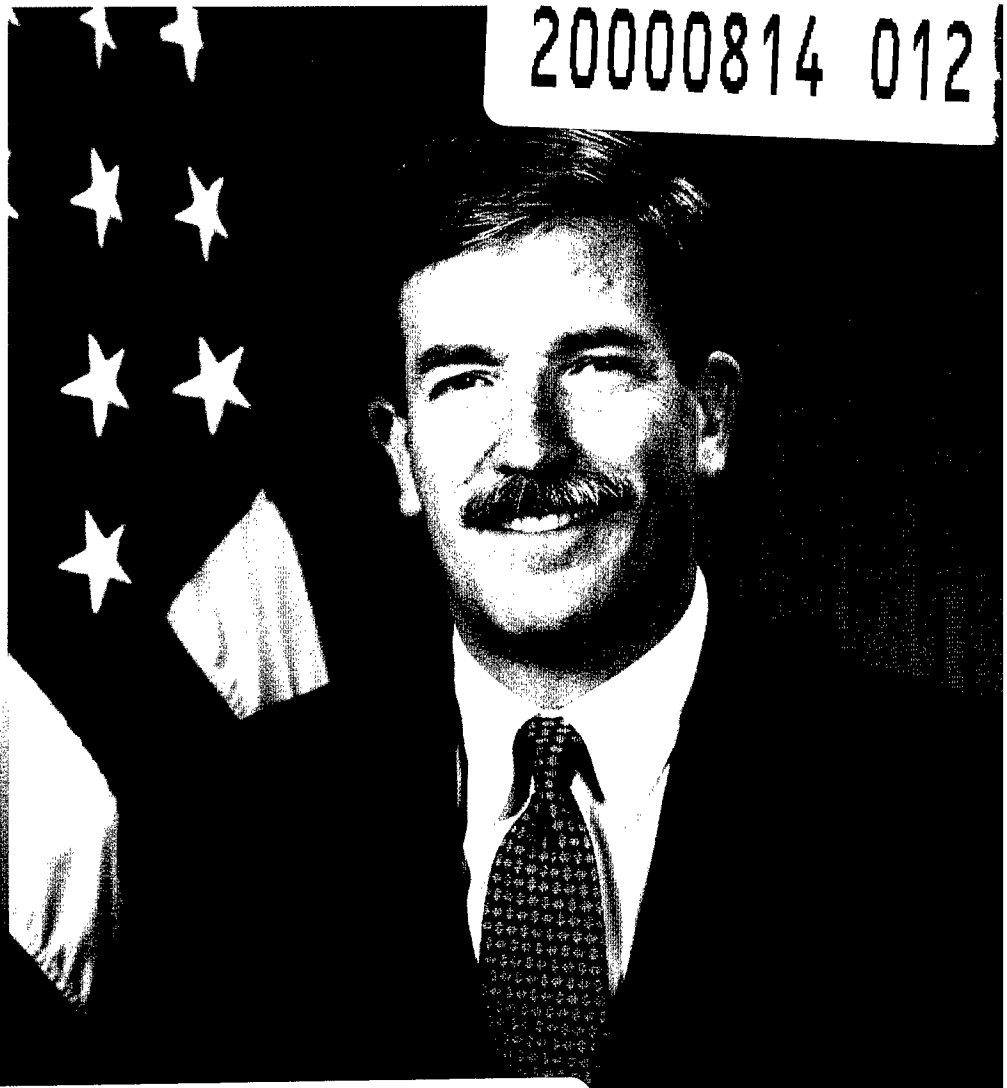
Gansler Names New Defense Procurement Director

Deidre A. Lee

Office of Federal Procurement Policy Administrator tapped to become DoD's new Director of Defense Procurement



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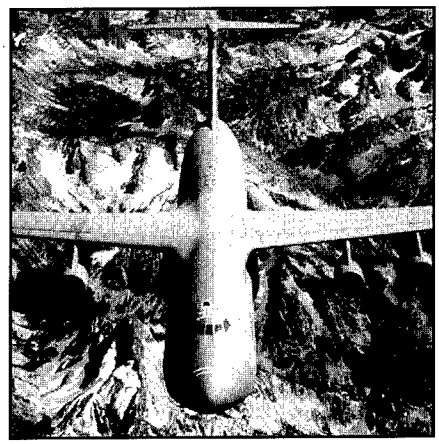
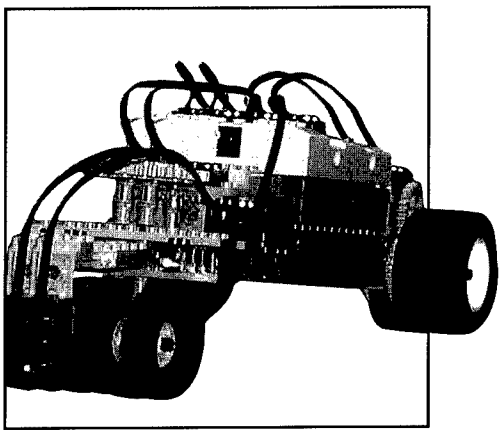
Dr. H. Lee Buchanan
Assistant Secretary of the Navy
(Research, Development and Acquisition)

A Bimonthly Magazine of the Defense

PROGRAM MANAGER

Vol XXIX, No.2, DSMC 155





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CORRECTION

The Army Roadshow Schedule published on p. 8 of the January-February 2000 issue of *Program Manager* was incorrect. The correct schedule appears on p. 49 of this issue.

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Managing Editor **Collie Johnson**
Chief, Layout and Design **Paula Croisetiere**
Editor **Norene Blanch**
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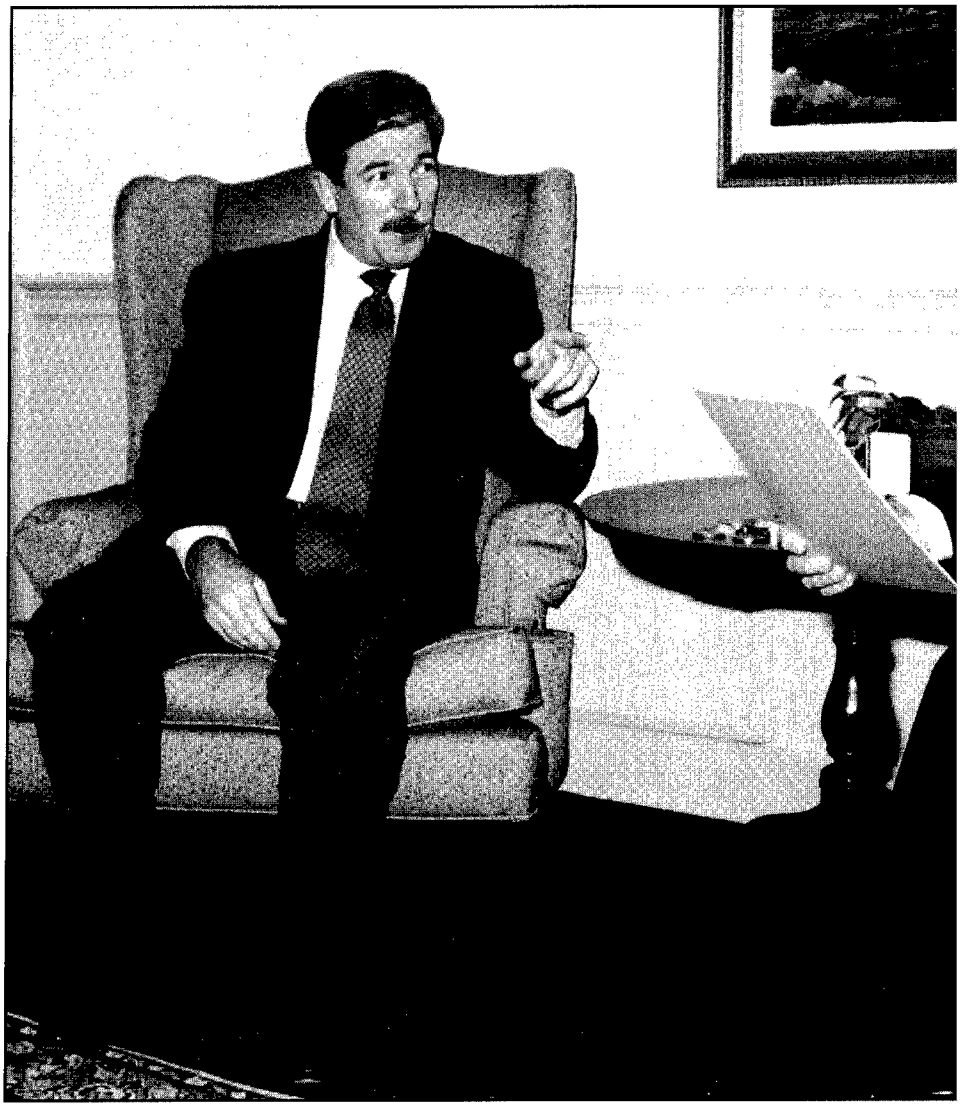
PM Interviews H. Lee Buchanan, Navy Acquisition Executive

"Competition is the Best Way to Get Value"

John Douglass left the Navy acquisition community in good hands when he ceded his position as Assistant Secretary of the Navy for Research, Development and Acquisition to H. Lee Buchanan Oct. 2, 1998. A former Naval flight officer, senior physicist, and experienced director of numerous advanced research projects/agencies, Lee Buchanan's appointment as Navy Acquisition Executive was a direct result of DoD's continuing efforts to find and place "movers and shakers" in key acquisition positions who would lead, question, innovate, and "rev up" the pace of acquisition reform.

A quick read of Buchanan's ambitious *1999-2004 Strategic Plan* (http://www.hq.navy.mil/RDA/stratplan.htm) reveals a Navy acquisition community that is working very hard to establish a blend of shipbuilding and moderization programs that allow today's Navy to maximize benefits from current platforms while "buying smart" for the future. Further, he and his talented workforce are striving to institutionalize new procurement mechanisms that will meet or exceed DoD's acquisition reform goals at a pace that staggers the imagination. All this in the midst of the greatest upheaval in recruiting and acquisition the Navy has ever experienced.

In February, Gibson "Gib" LeBoeuf, Deputy Director, Navy International Programs and former DSMC Navy Chair, interviewed Buchanan in his Pentagon office. Buchanan's responses reveal a man who seeks openness and readiness in everything he articulates or signs into



Assistant Secretary of the Navy for Research, Development and Acquisition, H. Lee Buchanan (left) is interviewed in his Pentagon office by Gibson "Gib" LeBoeuf, Deputy Director, Navy International Programs, DoD, and former DSMC Navy Chair. Speaking of DSMC, Buchanan said, "I look on DSMC as our [DoD's] most influential institution for producing and maintaining a professional acquisition workforce ... I would like to see you go even further. This place [DSMC] should be a hotbed of new ideas, a place to try out new strategies and new technologies before and during real program experience ... I think there are many, many new ideas that are just begging to be tried."

***Gibson LeBoeuf**, interviewer and coordinator of this article, is the Deputy Director, Navy International Programs, Department of Defense, and former Navy Chair, DSMC Executive Institute. **Julianne Kreidel,** article researcher, is a former editor for* Program Manager *magazine, Division of College Administration and Services, DSMC. Also a former Sailor, she is a Chief of Naval Information (CHINFO)-award winning writer and editor.*

Photos by Ed Boyd

policy. He wants to communicate fully and openly with Congress, industry, the warfighters, and acquisition professionals; and do everything it takes to make sure Sailors and Marines are provided with the safest, most dependable, and highest-performance equipment available within fiscal constraints. How does

he plan to do this? With lots of help and support, he acknowledges.

Q

What plans (hopes, dreams, expectations, etc.) do you have for Navy acquisition going into the new millennium?

A

When I came into office about a year ago, my first priority was to infuse the techniques of commercial business management into Navy acquisition. The two are different in many ways, of course – the Navy is not a business, and it would be wrong to contort it into one. But I found that the Navy was very slow to embrace too many beneficial commercial ideas.

Among the things we've worked on is to develop a small, common, and actionable set of performance metrics to use in assessing all ACAT [Acquisition Category] I & II Programs. This has been quite a lot of work but well worth the effort, both as a means for identifying potential problem areas, as well as helping to point the way to a strategy for recovery. We have been conducting these reviews about every six months, and I feel pretty good about the discipline that we are building.

As a next step, I would like to create a small, dedicated team of our most experienced managers to directly aid program management staffs with special needs and circumstances by providing in-house advice and consulting. In addition, I am very excited by the progress of our Program Manager Wargame series. These are direct simulations of complex program environments, replete with all the challenges of a real program compressed into only a few days. The few we have done have been very successful not only as a training tool, but also as a way to experiment with new strategies and techniques.

The harvesting of technology has been another focus. The Navy's future will depend on its ability to implement emerging technologies faster than its adversaries. I am not very satisfied that we have paid enough attention to this. One step in this direction was made when we established Dr. Jim DeCorpo as the Chief Technology Officer. We still need to provide him the "teeth" and influence to make the infusion of new technology as important as schedule and budget.

In the same way, we have focused a great deal of effort on Interoperability – at all levels: system with system, platform with platform, Service with Service, and ally with ally. About six months ago we established Rear Admiral Kate Paige as Chief Engineer and charged her with making interoperability a priority, not by fixing problems after the fact, but by preventing them early in the acquisition process.

None of these is finished, of course, but all are well begun, and I hope to give each enough momentum to persist in the new administration.

Q

Assuming acquisition reform is not one final ultimate goal, but rather a constantly evolving mission that changes with new missions and goals, how will you ensure further success? How will you continue to implement changes already made under acquisition reform?

A

To me, acquisition reform is really the process of getting back to basics – the efficient transformation of money into effective warfighting capability. The rub is in that word "effective," which is ultimately and completely defined by the threat. During the Cold War, we built up a very ornate process for acquisition that was just right for countering the Soviet Bloc. That threat changed, but our process did not. So in my mind, the task of "acquisition reform" is to strip away anything and everything of the current process that gets in the way of meeting the new threat – whether that means the way we establish requirements, gather and evaluate new ideas, manage our programs, or maintain the fleet.

To me the key is in creating a culture that is agile, anticipatory, and unafraid of change. I believe we are too concerned with the preservation of a process with too little attention to the result. We have been really good at establishing lots of new initiatives without demanding those initiatives result in real reform – changes in the process that are as specific and dramatic as the changes in the threat.

First we must decide what we need. I am 110 percent in back of the Chief of Naval Operations' push for a change to function-basing for requirements instead of the traditional platform-basing. His

IWARS [Integrated Warfare Assessment & Requirements System] process is driven more by the threat than by any obligation to preserve the infrastructure, and that is a theme I am trying to promote everywhere I can.

And requirements need to be somewhat malleable in the face of cost and schedule. If the last 5 percent in performance cost consumes 50 percent of the budget, then maybe it's time to challenge some assumptions for need. Or maybe a better strategy is to accept an incremental approach to the full requirement by providing block improvements to a system fielded early.

Then we must budget and finance our acquisitions. For instance, we often buy weapons at very uneconomical yearly quantities in the belief that this will preserve flexibility. In fact, this costs a premium – in some cases as much as 40 percent – that prevents us from obtaining other systems at all. Any successful company puts the business case on a par with performance and schedule. For the Navy, that would be a real reform.

"The task of 'acquisition reform' is to strip away anything and everything of the current process that gets in the way of meeting the new threat ..."

And finally, we must manage our programs. Each uniformed manager of a major program wears a command-ashore pin signifying his or her authority and responsibility. That tells me that we should expect that each program manager should have the same authority and accountability as the captain of a ship at sea. Our system provides neither very well, and then we wonder why programs underperform, overrun their budget, and deliver routinely late. Changing that is real acquisition reform.

Q

In your testimony before the Subcommittee on Seapower of the Senate Armed Services Committee (April 21, 1999), you mention the Navy has only recently begun to recover from the sacrifices of long-term readiness in favor of short-term goals following the end of the Cold War. What modernization efforts have been achieved toward that end? What is left to do; in short, how soon will we be "back on top?"

A

I was, of course, referring to the recovery of our procurement accounts. I certainly didn't mean to suggest that we are not capable of accomplishing our mission, or that we are inferior in any way. Thus I don't think we ever sunk from being "on top." But I will be happy to address our modernization efforts. Since the hearing you mentioned was focused on shipbuilding, I'll cover that first.

The big news on the surface side is the Land Attack Destroyer [DG-21] and the shift to electric drive. But modernization is not far behind, and includes plans to upgrade the combat systems of all but five of our Guided Missile Cruiser class ships [CG-47] for Theater Ballistic Missile Defense [TBMD] and land attack missions, while also incorporating a new Area Air Defense Commander capability.

Just as important as combat improvements, Smart Ship upgrades to all Destroyer [DDG-51] and many Guided Missile Cruiser [CG-47] class ships are directed at manning reduction and easing maintenance burdens for our Sailors. The upgrades include an integrated bridge system (which will assist in piloting and collision avoidance) and an integrated condition assessment system for propulsion and auxiliary spaces (which will automate condition-based maintenance).

Regarding submarines and carriers, most of your readers are aware of the new Virginia class SSN and our plans for the next generation aircraft carrier, the CVNX – follow-on to the Nimitz class carrier. But they are less aware of our plan to refuel, rather than decommission, several 688 class boats and the use of the Incremental Maintenance Plan – of which the Refueling Complex Overhaul is a part – to extend the life of our Carrier fleet.

The big new player for the amphibious Navy is the Landing Platform Dock [LPD-17] and its ability to replace four ships with one. Less well known is the Landing Craft Air Cushion [LCAC] Service Life Extension Program, which combines major structural improvements with C4I upgrades – Command, Control, Communications, Computers, and Intelligence – and adds 10 years to the service life of these landing craft.

The Joint Strike Fighter is the future of both carrier and marine aviation. But until it is fielded, we are modernizing the F-14 Tomcat as a precision strike fighter to bridge the transition to the new F/A-18E/F Super Hornet. It is receiving several tactical upgrades, including the Low Altitude Navigation and Targeting Infrared Night [LANTIRN] system for autonomous target designation of laser-

guided bombs, a new radar warning system, and digital flight control system safety enhancement. We'll also continue to upgrade F/A-18s with Global Positioning Systems [GPS]; electronic aircraft-to aircraft and aircraft-to-surface ship Data Links [LINK-16], which transfer contact and target data; Joint Direct Attack Munitions [JDAM]; and Joint Stand Off Weapons [JSOW], the follow-on to the Cruise missile.

The EA-6B Prowler, which proved so crucial in Kosovo, gets a new high-frequency [HF] and low-frequency [LF] transmitter and jamming system in Improved Capability III [ICAP III], as well as a new center wing section. The E-2C Hawkeye is getting improved engines, the Mission Computer Upgrade, and Cooperative Engagement Capability [CEC]. The S-3B Viking is getting numerous upgrades to replace obsolete and high-maintenance avionics systems.

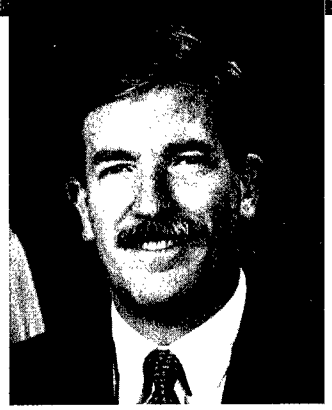
We have a refurbishment plan for the P-3C Orion to extend its service life to 50 years. We're providing it with enhanced sensors and Standoff Land Attack Missile [SLAM] capability (which performed very successfully in Kosovo).

For helicopters, we are converting the SH-60B and F Seahawks to SH-60Rs, equipping them with Inverse Synthetic Aperture Radar [ISAR], Advanced Low Frequency [ALF] Sonar, and a modern computer suite—as part of the Navy's Helo Master Plan to reduce type, model, and series numbers.

For the Marines, the CH-46E and CH-53D Sea Knight helicopters are being retrofitted with numerous safety-related improvements. We're also remanufacturing the AV-8B Harriers to the Radar/Night Attack standard. This process upgrades them with a new engine, a Commercial Off-the-Shelf [COTS] onboard computer, and JDAM capability.

Q *What partnering initiatives with industry do you hope to adopt in order to develop affordable, technologically advanced systems for Navy and Marine Corps wafighters?*

Dr. H. Lee Buchanan



Assistant Secretary of the Navy Research, Development and Acquisition

H. Lee Buchanan III was sworn in as the Assistant Secretary of the Navy for Research, Development and Acquisition Oct. 2, 1998. As the Assistant Secretary, Buchanan is the Department of Navy Acquisition Executive responsible for all research, development, and procurement of defense systems satisfying the requirements of the Navy and Marine Corps. He is also responsible for all acquisition policy and procedures within Department of Navy.

Prior to his appointment, Buchanan was most recently the Deputy Director of the Defense Advanced Research Projects Agency (DARPA). DARPA is the principal Agency within the Department of Defense (DoD) for research, development, and demonstration of concepts, devices, and systems that provide highly advanced military capabilities. As the Deputy Director, Buchanan was responsible for management of the Agency's high-payoff innovative research and development projects.

Prior to his appointment as Deputy Director, DARPA, Buchanan held the position of Director, Defense Sciences Office of the Advanced Research Projects Agency from 1989 to 1993. In that capacity, he directed $300 million worth of research and development in opto-electronics, high-temperature superconductivity, advanced computational mathematics, advanced materials, advanced power sources, lasers, and chemical agent detection and destruction.

From 1985 to 1989, Buchanan served as Program Manager in the Directed Energy Office at DARPA, managing programs in electron beam technology, high-power lasers, and high-power microwave technology.

Prior to working at DARPA, Buchanan served as Applied Science Division Manager at Titan Corporation from 1982 to 1985. Prior to 1982, he was a Senior Physicist at Lawrence Livermore National Laboratory, and served on active duty as a Naval Flight Officer in the U.S. Navy.

Buchanan holds a B.S. and M.S. in Electrical Engineering from Vanderbilt University; and a Ph.D. in Applied Physics from the University of California, Berkeley/Davis. He is currently a captain in the U.S. Naval Reserve.

Buchanan is married to the former Elizabeth Clayton of Nashville, Tenn. They currently reside in Oakton, Va., with their children, Clayton and Margo.

A

Let me dwell a little bit on the term "partnering." To many, that term connotes reduced emphasis on competition as a means to drive prices down, quality up, inefficiency out, and new technology in. This is not what I have in mind. Rather, it should refer to a routine dialogue with industry and abolishment of the old "over-the-wall" mentality of the Cold War era. Again the idea is to recognize that smaller budgets and a need for agility means trading cost, performance, and design for multiple missions.

At the engineering level, this means that design becomes a collaborative, system-oriented enterprise with close coupling between the Navy user and the industrial producer – often a team of manufacturers. This Integrated Process Team approach has already demonstrated its value in the *SSN Virginia*– the lead ship in the next generation fast attack submarine – and the Landing Platform Dock [LPD-17] design program by increasing both system performance and life cycle cost.

At the management level, an initiative that is just starting to take hold at some of our larger contractors is the use of Corporate Councils. Comprised of corporate executives and representatives from the Services and the Defense Logistics Agency, these councils are charged with increasing the use of efficient, single processes on DoD contracts, which will result in more affordable weapon systems.

The change in thinking doesn't stop at system delivery. We're also introducing technology refresher clauses in our contracts. And we're making greater use of performance-based Direct Vendor Delivery [DVD] contracts in which the producing contractor is also responsible for rapid delivery of critical repair parts and for improving the reliability of the repair parts and the weapons system as a whole. DVD contracts can be viewed as partnering or simply as innovative contracting, which achieves the same goals. DVD contracts make industry responsible for inventory management and use Electronic Data Interchange to generate requisitions and provide status directly to the customer.

Even in S&T [Science & Technology], traditionally one of the most segregated functions, government and industry are finding that each does certain things better than the other, and that competitive sharing is most often the best way to stimulate innovation and creativity.

Q

Is it possible to keep pace, or even better, be ahead of the game in acquiring state-of-the-art equipment and systems for the Navy, while still staying within congressional budgetary constraints? Is there a concern of having to "make do" with lesser technologies?

A

This is a very difficult question and one with profound implications. The key is in recognizing that for the first time in history, the time scale for technological evolution (18-24 months for computers and microelectronics) is much shorter than most other pertinent time scales (10-15 years for acquisition, 20 years for a Sailor's career, 40-50 years for a ship's life).

We must, therefore accept that constant refreshing of technology, routine upgrades, and the changing configurations that go with them, are the norm and not the exception. Here we must take several pages out of commercial industries' book. To survive in this arena, companies have no choice but to embrace open architectures, flexible manufacturing, just-in-time inventory planning, and enterprise resource planning to drive cost down, quality up, technology in, and inefficiency out. The Navy, suffering from both overvaluing the status quo and undervaluing the access of our adversaries to the most modern technologies, has mastered none of these concepts.

I believe that S&T, particularly, needs some attention. Technological superiority is now, as it has been for some time, our long-term strategy for success. But we have too long relied on our own in-house production of our most critical technologies and have failed to construct an efficient process for turning the results of those developments into warfighting capability. In short, our S&T structure, while very productive, is not well enough connected to our acquisition process. The reality of the situation is that the S&T budget will not increase much in the near term. So we must dramatically increase the yield of each and every S&T dollar. That will require some very big changes in the way we do business.

Q

Your FY 2000 plan calls for a lot of shipbuilding across the FYDP [Future Years Development Plan]. Are we trying to outpace some, as of yet unidentified threat? Does this fall in line with your defense strategy laid out in the QDR [Quadrennial Defense Review]: Shape – Respond – Prepare?

A

This is really a question that should be put to the force planners in the Office of the Chief of Naval Operations [OPNAV]. But I will go this far: The size of the Fleet (number of ships) can sometimes be driven by the size and capability of a particular, and sometimes driven by a requirement for agility and diversity in meeting multiple and geographically disperse threats. We have just left an era in which the former was most influential and are entering an era in which the latter is. To the extent that the capability and agility of platforms are driven by engineering and technology, acquisition becomes important. What you're seeing in the shipbuilding plan is a healthy, new partnership between the acquisition and requirement side to meet the very poorly known threat of the future.

Q

Beyond the obvious goals of ensuring a technologically superior Naval force, capable of sustaining a "Forward from the Sea" presence, it appears one of your other priorities is ensuring defense shipbuilders are able to compete in the world's market. Why is this so important to the overall picture of providing superior equipment for warfighters?

A

Two reasons. First, cost goes down with competition, and competition requires multiple shipyards. But the present vol-

ume of Navy ship construction simply can't support multiple yards at the most economical capacity. Commercial shipbuilding can add the difference. But, there's another, perhaps more subtle reason. If our shipyards can become competitive in the global shipbuilding industry, it will be because they have implemented all of the very best commercial practices and technologies. That is to our benefit in quality as well as cost. So we see it as a definite win-win.

Q

Turning your attention to international issues if we may, what is your view of the DoN assisting U.S. industry in capturing international sales? We understand that OSD is promoting a "partnership" role between U.S. industry and government. How do you see this working?

A

Let us not get confused. Accepting responsibility for "capturing international sales" and being a good partner can be two very different things. One does not necessarily imply the other.

To my mind, a partnership is a case-by-case cooperation built on specific, common interests. This is often the case – it is the interest of our defense companies to increase sales and thereby increase profits. When companies succeed individually against foreign competitors, it's generally good for the industry as a whole. The Navy can benefit as well. The smaller benefit is that each sale can reduce the Navy's recurring and nonrecurring costs and represents a savings in future acquisition. But the larger benefit is that it promotes interoperability with potential allies on which joint and coalition operations critically depend. In this case increased sales equals satisfaction of common interests equals good partnership.

"We must ... accept that constant refreshing of technology, routine upgrades, and the changing configurations that go with them are the norm and not the exception. Here we must take several pages out of commercial industries' book ... companies have no choice but to embrace open architectures, flexible manufacturing, just-in-time inventory planning, and enterprise resource planning to drive cost down, quality up, technology in, and inefficiency out."

But sometimes our interests don't coincide, for instance, in the transfer of advanced technology that would put us at an operational disadvantage against the potential purchaser or someone with whom they might deal later. In those cases, we might discourage that deal by denying certain license requests – dissimilar interests and no partnership beyond the obligation on the Navy's part to render a decision without delay.

So you can appreciate my view that while I do not feel it is the Navy's job simply to "capture International sales" for industry, I do feel that we have an enabling role in such ventures and should be activist when it is to our advantage.

Q

What is your view of cooperative development programs with allied countries? How does the Navy select appropriate programs upon which to cooperate?

A

Cooperative development programs are very important in the Navy's overall approach to systems acquisition and research and development. In fact, due to our constrained budgetary climate, cooperation is becoming increasingly important in terms of not duplicating the efforts of our allies; of leveraging our scarce acquisition investments; and of taking advantage of our fine technology and some innovative approaches, which our allies are pursuing to meet shared requirements.

Not all potential cooperative efforts turn out to be good deals, however, so it's too simplistic to sign up to a blanket endorsement of the concept just to increase their number. In many ways, these programs mimic international sales; both have potential

for multiple benefits and both offer significant hazards.

The trick is to assure that we collect as much value as we invest. First, we need to decide clearly what we are trying to get out of the deal. It is seldom as clear as price and product. Too often we enter a deal with far too little thought of what we want or how to seize the good result when it appears. For instance, if the objective is to jointly develop technology, then we must know how we are going to take possession of the technology in the event of success. It won't happen automatically.

Next, we must execute with the end result constantly in view and be ready to push away when promise fades. I believe that any potential partner is making that same calculation for himself. This is not to say that we can be fickle. When we make a commitment, we must be prepared to honor it. But the inverse is also true; we should only commit when we are prepared to follow through.

"One of the prime ways we, the Navy, can contribute to international sales is by working to make the FMS [Foreign Military Sales] process 'customer-friendly' to foreign buyers, and this means drastic reductions in time and paperwork."

As to where we find our deals: Our Systems Commands and Research and Development [R&D] facilities are very aware of our allies' acquisition and research and development programs; and often, through the means of our hundreds of Data Exchange Agreements, they are the first to bring cooperative opportunities to the table. Our Senior National Representative, Navy Rear Admiral Richard D. West, has organized meetings with his counterparts from 14 countries to harmonize naval requirements. We have the Staff Talks headed by Navy Rear Admiral Kenneth F. Heimgartner of the CNO Strategic Studies Group, with 17 countries, which deal primarily with operational issues, but are still a venue in which cooperative opportunities often surface. Navy International Programs Office, headed by Navy Rear Admiral Jim Maslowski, my point man on international issues, conducts naval acquisition reviews with three countries, and he is working hard to bring in all of our closest allies in discussions of this type. And our Office of Naval Research [ONR], headed by Navy Rear Admiral Paul G. Gaffney II, has two fine "outpost" organizations – ONR Pacific in Tokyo, and ONR Europe in London – which bring R&D cooperative opportunities to our attention quite frequently.

Q

Over the last decade, we have seen Foreign Military Sales [FMS] sales decline, and to some degree we have seen Direct Commercial Sales [DCS] pick up the slack. What is the meaning of this trend? Is the trend inevitable or can DoN actions reverse the trend? Is the trend a "good" or "bad" one?

A

I agree that there has been a trend over the last decade for some of our allies to migrate to the use of Direct Commercial Sales instead of Foreign Military Sales, and I think we understand why. First, the defense acquisition establishments of our allies have become more sophisticated. They are now fully capable of setting forth their requirements, specifications, and acquisition strategies and dealing directly with industry around the world. Second, our international friends, like us, have concluded that competition is the best way to get value. Therefore, the trend toward DCS is completely understandable. It was only recently that we renovated our FMS procedures to enable us to compete in international competitions.

Can the migration from FMS to DCS be reversed? I'm not sure it should be reversed since I don't know whether the trend is a good or bad one. What the FMS mechanism offers to an international customer is facilitation and streamlining of the process. They will tell us if we have been successful or not.

Q

We recognize that at the direction of OSD, DoN and the other Services have been tasked to reengineer the FMS process. Can you comment on the Navy's progress to date and give some examples of programs where this reengineering has/is occurring?

A

One of the prime ways we, the Navy, can contribute to international sales is by working to make the FMS process "customer friendly" to foreign buyers, and this means drastic reductions in time and paperwork.

In 1998 the Navy International Programs Office [Navy IPO] was designated a Reinvention Laboratory. Streamlining would be pursued in three phases. In Phase I, Navy IPO put its heads together with representatives of the U.S. defense industry to identify the problems. In Phase II, which ended in 1999, they were able to identify 150 separate issues and complaints that led to 12 initiatives. We have already initiated Phase III, the implementation phase.

One of the initiatives, Team USA, is an international "Integrated Product Team" to support Navy acquisition. Another has to do with improving what we refer to as "customer responsiveness." Navy IPO, working with the Defense Security Cooperation Agency, has taken steps to streamline the issuing of Letters of Offer and Acceptance, the means by which an FMS sale and associated contracts take form. A third improves up-front planning.

It is unlikely that all of these initiatives will deliver all of the desired result. But some will, and these will be the basis of real change in the system.

Q

In the area of shipbuilding, we have two questions. First, can you tell us what's happening with the DD-21 Class Land Attack Destroyer?

A

About two months ago the Navy awarded a Contract Phase II agreement for Initial System Design to the two industry teams competing for DD 21. This will continue industry's initial design efforts through Fiscal Year 2000 toward the competitive down-selection to a single team in Fiscal Year 2001. I have been very impressed with the technical innovation shown by both industry teams thus far, and we are committed to make the investment necessary to ensure the teams' success as they drive toward the aggressive cost and performance objectives for DD 21.

Several weeks ago, the Secretary of the Navy announced that both teams would pursue a fully integrated electric power system including modern electric drive. Electric drive offers immense opportunities for redesigning ship architecture, reducing manpower, improving shipboard life, increasing survivability, and offering more power for warfighting applications. And so the race is still on, and I am confident that this competition will give us the very best ship possible.

Q

Also in the area of shipbuilding, it seems each time a major airliner goes down or even the recent JFK tragedy, the Navy's best search-and-rescue teams are called in, most notably the crews assigned to USS Grasp. *Are there any plans to expand upon this element of your surface Navy? What about the possibility of interoperability with the Coast Guard to do the same job?*

A

USS Grasp is one of the Navy's four ARS-50 [Auxiliary Rescue/Salvage] class salvage ships. These ships, as well as five USNS T-ATF salvage tugs, are specifically designed to conduct ocean salvage and towing operations. They do their job superbly, and I know of no plans to expand the Navy's salvage posture. With regard to interoperability with the Coast Guard, the Navy and Coast Guard have refined their mutually supportive roles on projects like the EGYPT AIR operation. Their capabilities are complementary – while the Coast Guard ships are not designed to support salvage operations, they are very good as platforms for sonar search systems, and in other support roles during the course of an operation. On the other hand, the Navy does have a combat salvage mission and a capability (specifically diver support), which was purposefully designed into ARS-50.

Q

Restructuring, reengineering – these are catch phrases we often hear with regard to acquisition; is there more of this kind of thinking in the next five years? Ten years?

A

I think the day is gone when we could depend on an infrastructure or a set of business processes maintaining currency for very long. In fact, I believe that we should expect change to be constantly and fluidly moving from one organizational arrangement to the next as driving circumstances demand. This is certainly what the commercial sector has found, and I know of no reason to think that we are different.

Of course, all of this has been accelerated by the explosion in information technology [IT]. In previous years, the military was out front in the development and implementation of IT, but that has not been true for a number of years. We must now learn to be technology followers – not a comfortable role. I think that for the Navy, a big enabler and even driver, will be the Navy and Marine Corps Internet. For the first time, we will have a common and fully interoperable network. And riding on top of that network will be our implementation of Enterprise Resource Planning [ERP]. Together, we will be able to plan and implement decisions based on robust and accurate data. This culture of constant change will become easier and less threatening to all of us, and we will learn to use it to our advantage.

Q

Research is also a priority. Let's talk about the Basic Research Program and how it differs from all others (driven by the needs of the Navy and encourages risktaking). What successes have already been realized, and what others are you anticipating?

A

You are aware that my background is very much in the R&D world, and so you can imagine how much time I have spent worrying about how best to keep our military, and now our Navy, at the leading edge in technological capability.

It used to be, of course, that the dominance of the military in every technology was the core of our military strategy – remember phrases like *technological superiority, competitive strategies,* and *force multipliers*? The military was responsible for most significant advancements. In the 1980s, however, commercial industry was fighting its own war and developing its own technological superiority. It did not take long for commercial industry to outpace developments in the

military, particularly in microelectronics and information technologies.

More importantly, the way technology is created and used in commercial industry has changed. Because the technology content of products is so much a driver of market share; and because product development cycles are so short, much of the energy previously devoted to the creation of technology is now dedicated to its deployment.

One of the first things I did was to begin to create a similar environment in the Navy. Though we have some wonderful organizational machinery for producing new technologies – the Office of Naval Research is world class – and we are natural and voracious consumers of technology, there was too little fabric for connecting the two. And so we created the position of Chief Technology Officer as the one person most concerned with getting new technologies out of the lab and into fielded weapon systems.

It is significant that our investment philosophy is changing as well. During the Cold War, we had to maintain a very broad, in-house development effort to make sure all the bases got covered. Now, with so much going on in the commercial sector, we can't hope to cover that kind of breadth. And we shouldn't have to if we can create a good capability for "technological reconnaissance" and an efficient process for bringing technology in from outside. Again, we need to go to our commercial brethren for lessons.

So, I do see some big changes in our R&D process in the near future – not so much because we want to, but because we have to. Otherwise, our adversaries who have a credit card and a Radio Shack catalog may have better access to advanced technology than we do.

"I think the day is gone when we could depend on an infrastructure or a set of business processes maintaining currency for very long. In fact I believe that we should expect change to be constantly and fluidly moving from one organizational arrangement to the next as driving circumstances demand."

Q

Smart Ships, like USS Yorktown, *have been in the news a lot lately; a wonderful example of naval research and development, with a strong test phase completed. Will all Navy ships one day be "Smart?" What about the Sailors aboard Smart Ships: with fewer Sailors needed, is there any chance of their obsolescence? Or are we as some say fostering a smart, technologically advanced generation of "Smart Sailors" to go with our "Smart Ships?"*

A

I've heard it said that a major difference between the Army and the Navy is that the Army equips the man and the Navy mans the equipment. Traditionally, there's been a lot of truth in that. It arises from an obsolete view of people that Secretary of the Navy Richard Danzig refers to as the "conscription mentality" – the idea that Sailors are a cost-free commodity to be squandered without consequence. In many ways we are still relegating valuable human capital to the most repetitive, menial, and unsatisfying jobs while wondering why life cycle cost is so high and morale is so low.

To me, Smart Ships integrate people and technology together so that the two complement each other. It's really a classic systems design problem with the human as the smartest component but not necessarily the most patient, the most sensitive, or the most tolerant of harsh environments.

Will the Sailor disappear? Well, the GENDET – non-rated seaman – might. The mess cook might. The paint chipper might. But the smart, highly trained, multidimensional warfighters will flourish and will work as one with their crews and their ships because they're allowed to do what they do better than any machine because machines are doing what they do best. There will be fewer of them, but they will be challenged, rewarded, and retained.

The Navy embarked on the prototype installation of Smart Ship technologies onboard *USS Yorktown* (CG 48). The success of *Yorktown* has led to the expansion of this program throughout the

Fleet. All 27 ships of the Ticonderoga class are programmed for installation within the current FYDP, and a parallel effort has been initiated for the 57 ships of the Arleigh Burke destroyer class. Additionally, we have completed the prototype installation of Smart Ship technologies in *USS Rushmore* (LSD 47), launching the Smart Gator program; and are on track initiating the Smart Carrier program.

Keeping in mind the need to stay within budgetary constraints, you've already begun focusing on fewer technological areas. What are some of those areas? What scale do you use in order to determine precedence of where you'll focus time and monies? Is there a negative side to "focused funding?"

We have already talked about the difficulty of covering the great breadth of relevant, new technology using the old process even if the budget was not the constraint. Let's not forget that one of the main purposes for conducting R&D is to make the Navy a smart buyer in acquisition. So, the question is not which technologies do we focus on and which can we do without; rather, it is which ones must we do in-house because we cannot find it on the outside.

To be sure, there are technologies that fit this bill. Underwater acoustics, advanced explosives, exotic sensors are all areas that need continuous Navy involvement. But framing the issue this way allows an interesting new perspective to emerge. There are some technologies that are just so important that we can't risk developing them in-house because it would take too long and ultimately take the wrong direction. I put microelectronics and most information technologies in this category. These technologies are just moving too fast for the Navy to expect to remain competitive.

So, then, how do we stay current? I believe we must develop within the Navy a new function. Just as our intelligence community is very adept at learning the technologies being developed by our adversaries, so we need a similar window into the future technological directions of our own industry. Only with this view can we hope to make good "make/buy" decisions.

Congress always seems to want to focus on the total number of ships, subs, and planes the Navy has. Call it downsizing, or rightsizing; can your Department realistically keep pace with the demands of the 21st century with a smaller force? Can super ships, replete with all the best science and technology can offer, really take the place of a downsized, rightsized Navy and Marine Corps?

We touched on this before earlier. It is very tempting to respond to budget reductions by consolidation of capability on fewer platforms. But this ignores the fact that agility and dispersion of action are also necessary capabilities. So it's a balance. Given that the planet is as big as it is, and the time it takes to get from one spat to another, given the number of places and the kinds of situations where we want our influence, our numbers can't get smaller without giving up something.

You've been a frequent visitor to the DSMC campus. What do you like about our college, or what do you think we could do better in support of giving Sailors and Marines the acquisition education they deserve?

I look on DSMC as our most influential institution for producing and maintaining a professional acquisition workforce. You have established acquisition as a profession and set the standards of the professionals that you train. I would like to see you go even further. This place should be a hotbed of new ideas, a place to try out new strategies and new technologies before and during real program experience. I believe DSMC should become the main point of entry for all of the commercial techniques I've been talking about. I'm a big fan of simulation and gaming as an alternative to traditional classroom work. We continue to have trouble getting our new program managers to the 14-week Advanced Program Management Course [PMT 302], so I would want to implement "distance learning" for delivery of part of that entire curriculum. I think there are many, many new ideas that are just begging to be tried.

What legacy does Lee Buchanan want to leave when his title becomes former Assistant Secretary of the Navy (Research, Development and Acquisition)?

Two years is really not enough time to create a legacy in this business. When I took office, I aspired to do three main things during my stay.

- First, I wanted to give our program enough focus and rigor that we can really manage the outcome rather than merely accept it.
- Second, I wanted to firmly plant the idea that systems can't be designed and acquired separately if they will be expected to work together in the end. In other words, interoperability must be designed in up-front.
- And third, I wanted to put into place a process and a culture that actively guides and directs new technologies into systems rather than waiting for it to find its own way there.

If I can do these three, then my time here will have been well spent.

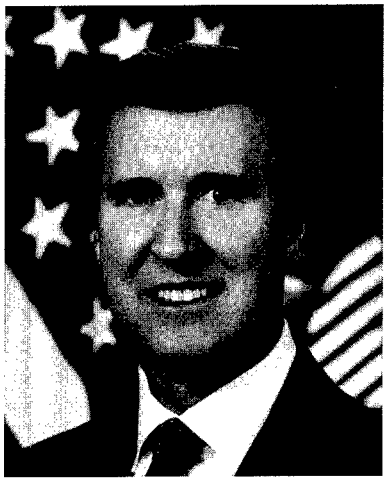
On a personal level, would you tell us the best advice you ever received to prepare you for the job you have today, be it from an associate, relative, or friend?

Well, I hope this doesn't sound too mushy, but there's an old song that has words that I think of often. They go something like, "Work like you don't need the money, dance like there's nobody watching, and love like you've never been hurt." In less poetic words, "Don't take yourself too seriously and have fun." That's what I would pass on.

AMERICAN FORCES PRESS SERVICE

Cohen Gives Peek at Fiscal 2001 Budget

JIM GARAMONE



ASHINGTON – DoD will hit the $60 billion mark in procurement in its coming fiscal 2001 DoD budget request, Defense Secretary William Cohen said Jan. 28 to the Defense Writers Group.

Cohen also said the budget addresses quality of life issues such as the basic allowance for housing and the military's TRICARE medical system.

"When I first took over three years ago the procurement level was down around $43 billion," Cohen said. "This year we will hit the $60 billion mark."

Then-Chairman of the Joint Chiefs of Staff Army Gen. John M. Shalikashvili first proposed the $60 billion modernization amount in 1995. Each year, the amount crept toward that level and in fiscal 2001 will hit the magic number.

Cohen told reporters that lessons learned in Operation Allied Force over Yugoslavia will be part of the procurement effort in the budget request. "Some of the items that we have allocated resources to would be additional Joint Surveillance and Target Attack Radar System aircraft, the Global Hawk unmanned aerial vehicle, a squadron of electronic warfare aircraft – EA-6Bs – and, of course, increase in our Joint Direct Attack Munitions," he said.

He said the final Lessons Learned Report will be released in February.

Cohen said he is proud of the pay and retirement reforms that were part of the fiscal 2000 budget cycle. He said these are having a good effect on morale around the Services. But now, he said, he wants to address other quality-of-life aspects, particularly housing and healthcare.

In housing, DoD is making changes to the basic allowance for housing," Cohen said. "Frankly, I was not aware at the time that there was such a disparity in terms of off-base cost. It was averaging about 18.8, almost 19 percent out of pocket."

So if servicemembers don't live in base housing, they pay 19 percent out-of-pocket to live off-base. "The law actually requires 15 percent as far as a servicemember is con-

cerned," Cohen said. "So we put the money in this particular [fiscal 2001] budget to eliminate that."

In the 2001 budget, out-of-pocket expenses would go down to 15 percent and then over a five-year period would fall to zero, Cohen said. "I think [this] will have a major impact on quality of life and also on morale for the forces."

Servicemembers have consistently complained about military healthcare, Cohen said. "TRICARE has been plagued with problems in terms of the contracting," he said. "We need to streamline it to make it as universal in application as possible."

This means servicemembers can move from one TRICARE region to another without having to start the process all over again. "We're trying to make it as seamless as possible so when you sign up you can pretty much expect the same kind of benefits wherever you go, as opposed to having different area arrangements in terms of a contract," he said.

Cohen said DoD will push for better business practices on the part of military medical facilities so they can take advantage of the techniques and technology that the private sector has.

"Then we're also looking into how we can make the TRICARE Prime more equitable," he said. "We have proposed to eliminate co-pay for those who are in the TRICARE Prime program so that when they have to go off base for treatment, they don't have to come up with the co-pay out of their pocket."

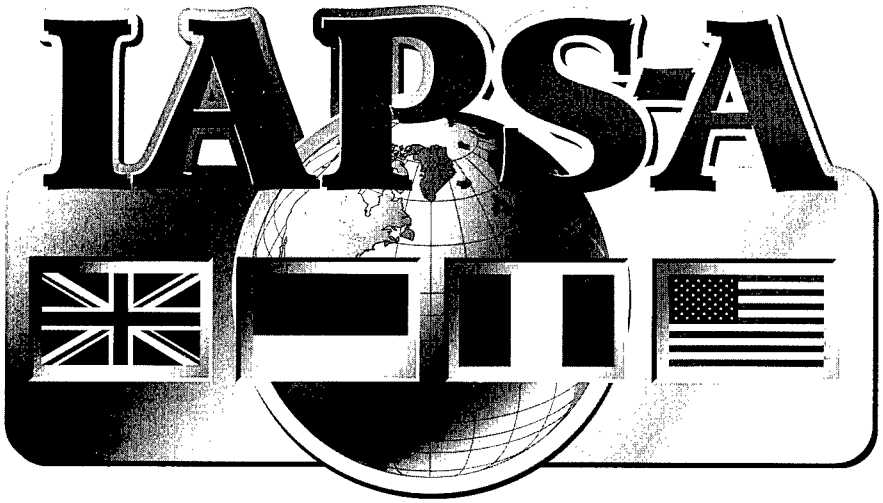
Cohen said the budget request proposes two more base realignment and closure rounds in fiscal 2003 and 2005 for DoD. "Can we achieve it this year?" he asked. "I don't know. But I continue to say this is an issue that [the Congress] will have to wrestle with in the coming year."

"Those members on the committees that have jurisdiction over this will have a choice. They can say they can continue to carry the excess infrastructure and see either readiness accounts or operations and maintenance accounts or procurement accounts suffer; or be forced to raise the top line even further to carry the excess infrastructure.

"But I will continue to point out, these are the choices," Cohen said. "There's a big wave coming in terms of what we have to procure, and the way to help pay for that is to eliminate excess overhead."

Editor's Note: This information is in the public domain at **http://www.defenselink.mil/news.**

Twelfth Annual International Acquisition/Procurement Seminar — Atlantic (IAPS-A)



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- Prof. Don Hood, Director, International Acquisition Courses
- Sharon Boyd, Projects Specialist

E-mail
Hood_Don@dsmc.dsm.mil
Boyd_Sharon@dsmc.dsm.mil

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COTS: Is it Just a ☑ for Your Program?

Or Are You a Real Part of Acquisition Reform ?

LUKE CAMPBELL

The subject of Commercial Off-the-Shelf (COTS) is complex because there is no single COTS issue – there are many, depending on your perspective and position in the acquisition life cycle. In addition, the overall picture remains clouded by wild speculations about COTS savings and advantages, which are at least partially true. Any new concept requires some amount of hype to establish a critical mass to get it underway. We are beyond that stage with COTS, and the facts must now emerge. In this article, I examine COTS effects on three broad life cycle phases: development, support, and future growth or upgrades.

A Little Background

COTS is often touted as "we-do-it." However, if a program truly embraces COTS, it becomes apparent that while *some* acquisition changes are required during development – *substantial* changes are required during support.

To many, COTS is synonymous with computers. Most "computer experts" have only minimal understanding of COTS and base their acquisition goals on a wholly insignificant view of the life cycle. To be blunt, just because you have a computer on your desk, does not make you an expert on the subject of COTS use. The primary differences between COTS in desktop systems and COTS in weapon systems are desktop integration vs. platform integration and life cycle times. Big differences. More will be discussed on these later.

You might say there are two COTS philosophies: Little COTS and Big COTS. Little COTS philosophy says, "We looked at commercial systems," or "We use an Intel processor." The information in this paper is based on Big COTS philosophy regarding the E-2C aircraft and its Mission Computer Upgrade (MCU). A sampling of Big COTS in the MCU is as follows:

The Hawkeye 2000 Airborne Early Warning and Control aircraft being test flown by the U.S. Navy.

- The operator-display workstations are developed from a performance-based specification, which is not under the control of the PMA.
- MCU runs a UNIX Operating System (OS).
- MCU uses operational software in C++, which is developed by a University.
- MCU is connected by Ethernet to a mission computer repackaged to fit in the existing volume, but with no design changes from its commercial counterpart.
- MCU also runs a second commercial UNIX OS.
- COTS Cooperative Engagement Capability hardware and software are connected by a second Ethernet connection.

All these highly volatile systems must play in tune. This is more than just a considerable configuration management challenge: a methodology must also be in place for Technology Insertion (TI). This is Big COTS.

The concept of, "Just insert new technology during production," ultimately became one of the most questionable strategies used to initially support the COTS philosophy. It implied two major considerations that were, apparently given little thought at the time:

***Campbell** is the PSA IPT lead, Naval Air Warfare Center, Patuxent River, Md.*

Photos courtesy Northrop Grumman

- COTS didn't need to be tested.
- Somehow, money would be appropriated for this condition.

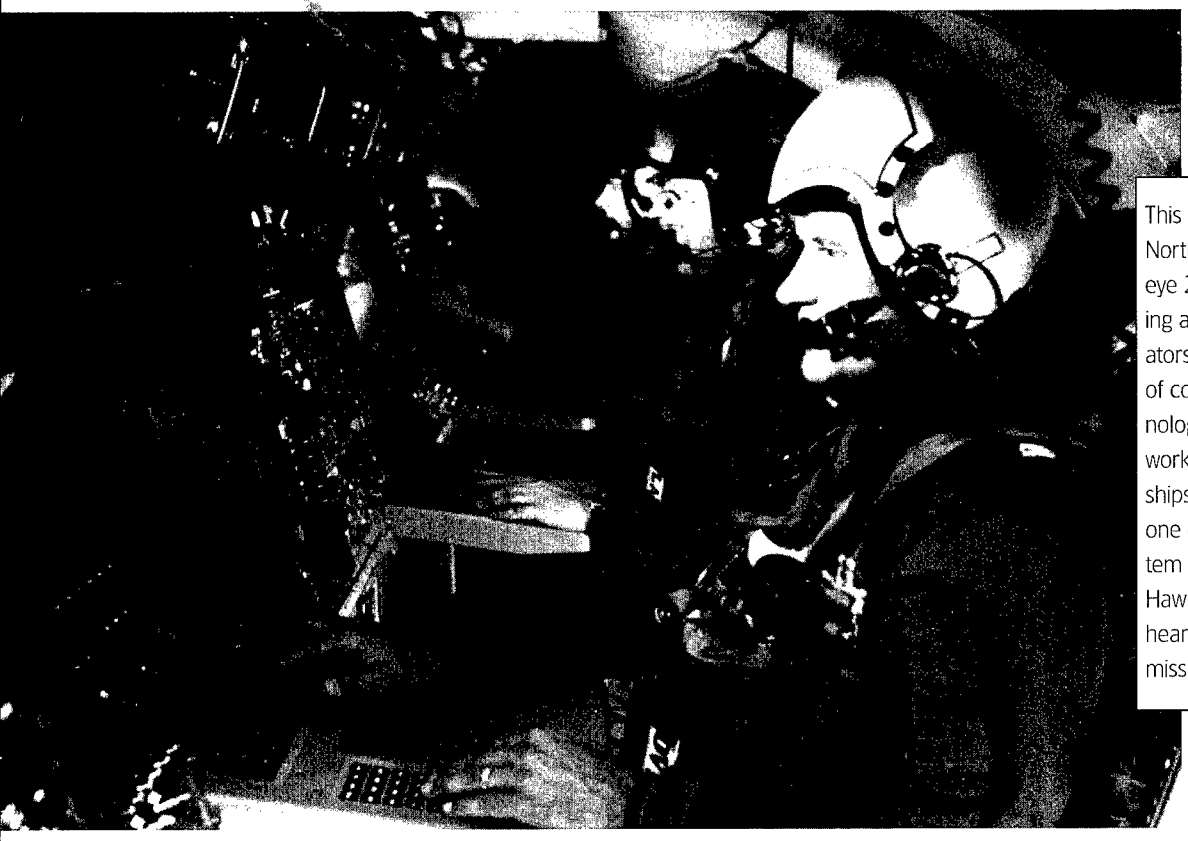
Attempting to cross-dress a well-known concept in a simple-office PC environment to a complex weapon system with an even more complex acquisition cycle – the support process – can lead to disaster.

Disaster? What Disaster?

The E-2C operator workstations were developed by a sister Systems Command (SYSCOM) under a performance-based specification. Many units were not functional when installed into our system. Simple solution, right? Just get the vendor to fix what's broke. The problem was that the units weren't broke. Since the delivered products all passed contractor-factory acceptance tests, there was nothing for the vendor to fix. Perplexed? So were we. One of our first *lessons learned* was that Class II changes to the vendor became Class I problems in our system. After considerable discussion about this situation, the vendor was very amenable. Establishing many Process Action Teams, over a period of one year the vendor made sweeping analysis of sub-vendors and developed very detailed processes – but the results of the product did not change. Problems such as this occur several times each year, and program managers electing to use COTS must be prepared to solve them.

Our solution is a Program Support Activity (PSA). The PSA subsumes the clas-

The concept of, "Just insert new technology during production," ultimately became one of the most questionable strategies used to initially support the COTS philosophy.



This is the business end of the Northrop Grumman E-2C Hawkeye 2000 Airborne Early Warning and Control aircraft: the operators' consoles. Taking advantage of commercial off-the-shelf technology and commonality with workstations used on U.S. Navy ships, these workstations are just one of the several significant system upgrades constituting the Hawkeye 2000 system. The heart of Hawkeye 2000 is the mission computer upgrade.

sical Software Support Activity (SSA) functions, but adds the critical functions of Technology Insertion, a clearinghouse for Configuration Management, and what we call color-coding. More will be discussed on this later.

A Bumpy Start — A COTS Failure

We tried to use as much COTS as possible. One of the first things we tried was to use the COTS databases. We found that they were big – very big and S-L-O-W – glacial, to be exact. The basic problem with commercial databases is that "real time" to them is similar to a transaction at an Automated Teller Machine (ATM). During the same time it takes for that "fast cash" ATM transaction, several enemy fighters need to be shot down. "Tactical" to these commercial databases means to get the card out of the ATM because it's dark, and the person coming up behind you is unknown. For DoD, several missiles impacted a destroyer in this same period. "Oops."

The *lesson learned* was perspective. Our military needs were not only well in advance of our commercial needs, but more disturbing, were also in advance of industry understanding of the concept of speed and performance. The problem was that our market is quite small – insignificant – in fact. Military systems are an oddity to industry – a speck of dust.

We did not give up on commercial databases; we discussed performance with the vendors at some length. After discussions with industry about speeding up their databases, *our solution* was to go back to the "do-it-yourself" database, and give up on COTS *this time*. Another *lesson learned* was that decent system engineering and analysis of industry products is necessary. So called *vaporware*, or software that is seemingly never delivered, is rampant. *Our solution* was to take a six-month loss in schedule.

More Vaporware

We also wanted a multi-level-secure environment. After performing surveys for capability and market share, we chose Digital Equipment Corporation's (DEC) Multi-Level Security+ (MLS+) system. This lasted for four years before DEC announced that the market for this product was not nearly as strong as envisioned, and the product would be discontinued. The *lesson learned* was when you use COTS, be prepared for change. Industry moves to the beat of quarterly profit – period. Fortunately for us, we were not entirely unprepared for this eventuality, and *our solution* was to fall back on plain-old UNIX, and use our well-designed software architecture for the security features we need.

COTS Computer Performance — Some Perspectives

The performance growth curve for military computer systems has been virtually flat for the past 10 years because of COTS use. We are only now climbing the curve again. Blasphemy? Let's look at the data. Certainly, there is no argument that the raw power of hardware is light years faster than it was 10 years ago, and there are no 640K memory barriers. But consider the system. Think about the desktop applications you run today and the performance of those applications 10 years ago.

On the negative side, your disk drive is *still* 90 percent full – except that today it's 2 gigabytes, while it was 20 megabytes back then. True, you didn't have 100 megabytes of "essential" pictures from the World Wide Web. Or consider word processing. The file size of a page of text – just plain text – is 30K, compared to 2K back then. What about performance? Do you actually see the 366 megahertz speed of the latest Pentium compared to the 2 megahertz Z-80? Certainly systems are faster – but 150 times faster? Efficiency is no longer a part of our vocabulary.

So What, You Ask? Let's Look at the Positive Side

Today, we can easily embed pictures in documents, making them highly readable and understandable. We can ship them around the world at breakneck speeds (assuming the network is up today). We can develop huge spreadsheets for Team Work Plans and Earned Value Management. Who doesn't like having the ability to make a presentation in color, with pictures, sound, animation, and 10 or more fonts using an electronic projector? Is it even *possible* to still make a presentation with short bullets on a typed sheet, which are copied to a transparency for use on an overhead projector? On another front, new Computer-Aided Design (CAD) software applications speed up designs, basically eliminate paperwork, and perform automatic calculations, saving untold workhours and millions of calculation errors.

While much of this is tongue-in-cheek, the point is that while we have applications that provide massive capabilities; for the most part, this same software has gobbled up the hardware performance gains in the past 10 years. Software is the Achilles' heel of COTS use – Operating Systems that used to take 5K worth of memory in the "write-it-yourself" good old days now consume megabytes with a commensurate use of processor throughput. Compilers that produced highly optimized code now define optimization in megabytes; but that's okay, since we have gigabytes of memory, and to vendors, memory is like the nacho chip commercial with Jay Leno – "Just eat them, we'll make more."

What's the Point?

Bettering software efficiency means the same hardware can perform more functions. Conversely, bettering efficiency means we don't need as much of that same hardware – saving weight, power, volume, cost, and Mean Time Between Failures (MTBF). *A full frontal assault from the military to private industry in the area of software efficiency could reap huge benefits.* Frankly, this would also benefit industry for most, but not all, of the same reasons. "Hmmm."

Development Phase — Good News

So those were a few major issues during development. The COTS *good news* is that other than the trivial cost of buying a license for use, we did not have to develop an Operating System. We did not have to *develop* a computer. We did not have to *develop* Input/Output and protocols. This all translated to dollars. The new COTS mission computer costs

about $2.5 million less per unit than the existing mission computer (which is no longer supported by the manufacturer). On a packaging COTS-O-Meter scale ranging from commercial to mil-qualified, and since no data existed, we were leery of off-the-shelf. Hence, we paid $12 million to have the new mission computer repackaged and fully qualified for our use. To date, we have experienced no packaging failures from our mission computer.

At the same time, the operator workstations were developed by our sister SYSCOM for shipboard use. We paid nothing for this development. Due to our association with a larger shipboard market, our unit cost for these workstations dropped by over 60 percent in a couple of years. On the other hand, their approach to packaging was less stringent than our mission computer – and it showed. We have experienced failures of connectors and pins; and on one assembly, use of stock that was too thin has caused warping and physical failure. Lack of space on the boards for marking is a problem. However, under the contract the manufacturer is taking all this in stride, and together with our sister SYSCOM, these problems are being addressed and corrected.

Second Phase — Support

The basic problem during support can be summed up by the Class I/Class II scenario mentioned earlier. For our workstations, we have no guarantee that yearly installs, spares, or repair-buys will procure the same functionality. A recent example is sub-vendor firmware change in the keyboard. The vendor changed diagnostics and the OS to accommodate this Class II change, and units passed the vendor's FAT (Factory Acceptance Test). However, when installed in the E-2C, the units did not work. OS calls had to be modified in the software. While this was a relatively minor difficulty that cost a couple of weeks and the minor sum of tens of thousands of dollars, it pointed out a future discrepancy. Our *lesson learned* was that parts – such as spares – leaving the vendor would have to be screened before entering supply, lest we fill the pipeline with scrap.

We are still grappling with this problem today. Support is historically based on Aircraft Procurement Navy-5 (APN-5) dollars after deployment. However, with COTS upgrades occur, which can change end-system functionality. An argument can be made by Naval Inventory Control Point (NAVICP) that the spares and repairs they purchased were exactly the part number they were given – so it's not on their watch. Conversely, the program office argues that the development is over, integration is complete and it works – so it's not on our watch. "Hmmm."

Funding has been a point of difficulty for some time. Our solution to this conundrum has been to request [and so far, successfully defend] an APN-5 Operational Safety Improvement Program (OSIP) that allows us to test these new technology installs, spares, and repairs before they are used in our aircraft. This is done very economically using the same bench assets we have for long-term software support. It does, however, stick an integration agency squarely in the middle of the supply pipeline – leaving logisticians squirming even more than usual.

We need the DoD community to understand that we are not an isolated case – more will follow. The traditional boundaries, which define colors of money, are being drug across each other.

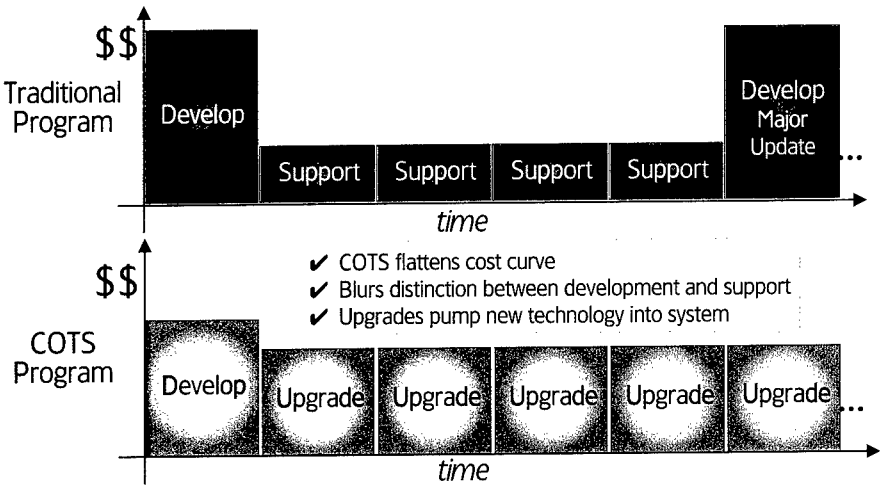
Third Phase — The Future Technology Insertion and the Great Unknown

Technology Insertion comes about for three primary reasons: yearly buys, Plug 'N Play, and future upgrades. The first occurs when you attempt to make yearly buys of COTS equipment. Just like the PC market where you cannot buy last year's model, and you have to accept the faster processor, more memory, and bigger disk drive (usually, at a lower price), likewise, our COTS equipment changes too. For our mission computer, we have roughly a four-year cycle. For our workstations, the cycle is about every year. To mitigate the latter, our solution was to block-buy two years' worth of Government Furnished Equipment (GFE) at the same time.

There is a cost associated with these changes, as well as time to test. They cannot be blindly inserted. Operating Systems, firmware, protocols, and diagnostics change – and these changes generate changes to the operational software. The Operational Evaluation community has not been hit by this creeping technology yet – but they will. In our case, we are now planning the 2001 aircraft to have next-generation workstations, while the 2003 aircraft will have next-generation mission computers. Our approach to these upgrades is that they do not extend the functional capability from a Fleet point-of-view, nor will they change the repair scenarios. As such, while we contemplate the test suite for these upgrades, we do not intend to have Operational Evaluations. *This is another area where a common point-of-view and approach across DoD would be most beneficial.*

Military needs were not only well in advance of our commercial needs, but more disturbing, were also in advance of industry understanding of the concept of speed and performance.

A second technology-insertion cause is Plug 'N Play. In our case, while we do not have the selection of software en-



joyed by the games community at the local electronics superstore, there are software capabilities such as Air Task Order and fusion algorithms which have been developed by other organizations. This software requires some amount of integration, but its insertion time is considerably less than a start-from-scratch development – with commensurately smaller cost.

The third technology-insertion cause is future upgrades. A major radar upgrade for the E-2C looms on the near horizon. This will require considerably greater computer performance than we have now installed. The thought for many years is that we would take advantage of the COTS performance increases through time and install new computers commensurate with the production of new radar systems.

The point of using COTS is to avoid the large development costs historically associated with new upgrades. The cost of this large avoidance will be a continuum of smaller costs between development and upgrade (opposite chart).

Benediction

Actual data, and therefore, concrete answers for the full life cycle are not yet available, and in a rapidly changing organization, they may not be of value for long. It's hoped that the experiences outlined here may best help by stimulating thinking for additional solutions and discussion.

To date, we have saved money and provided the fleet with capability through COTS – and we're not done.

One point is clear, we need understanding and flexibility regarding the total life cycle of COTS, and we don't have years to achieve this end-game. We need changes in acquisition to save more money to continue program success.

If understanding and flexibility are not achieved, COTS will become just another ☑. We have too many of these now.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **CampbellLO@navair.navy.mil.**

Foreign Students, Dignitaries from Japan Tour DSMC Main Campus

Students and staff from the Graduate School of Security Studies, National Defense Academy (NDA), Japan, tour the DSMC main campus, Fort Belvoir, Va., March 6 to improve their understanding of U.S. armed forces and their acquisition organizations. This is their third year to visit, and DSMC has continued to promote and encourage this constructive engagement and interchange with our allies. Pictured from left: Maj. Akio Tomita, Japanese Ground Self Defense Force, Research Associate of the Research Committee; Lt. Cmdr. Yasufumi Miyahara, Japanese Maritime Self Defense Force, NDA student; Lt. Gen. (Ret.) Naruhiko Ueda, Senior Executive Director, Defense Research Center; Air Force Brig. Gen. Frank J. Anderson Jr., DSMC Commandant; Lt. Minako Hayashi, Japanese Ground Self Defense Force, NDA student; Capt. Takeshi Yanagitani, Japanese Air Self Defense Force, NDA student; Huniichi Tanida, NDA student; Tony Kausal, DSMC Air Force Chair.

Photo by Richard Mattox

Gansler Announces Acquisition and Logistics Reform Week May 22-26, 2000

THE UNDER SECRETARY OF DEFENSE
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WASHINGTON, D.C. 20301-3010

JAN 24 2000

ACQUISITION AND TECHNOLOGY

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
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GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR OF OPERATIONAL TEST AND EVALUATION
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Acquisition and Logistics Reform Week – May 22-26, 2000, "Embracing Change for the 21st Century Warfighter"

For the past four years, we have highlighted acquisition reform initiatives through special activities during Acquisition Reform Week. Last year, we combined acquisition and logistics reform and had a very successful event. To build on this success, I have designated May 22-26, 2000, for our next Acquisition and Logistics Reform Week. The theme for the week will be "Embracing Change for the 21st Century Warfighter."

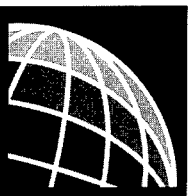
Sometime during this week, I would like each organization to cease their normal operations for one day and focus on acquisition and logistics reform in order to share implementation successes and determine what can be done to continue the reform. Commanders and managers at all levels will be responsible for planning and conducting their own activities for the day. To that end, we will not dictate the day's agenda. Each organization will design their own activities consistent with their needs. These activities may include, for example, case studies, discussions of lessons learned, panels, speeches, classes and simulations.

To support you, the Defense Acquisition University's Acquisition Reform Communications Center (ARCC) will be providing a package of training materials. Organizations may use these materials to supplement or add focus to their own training programs both during Acquisition and Logistics Reform Week and throughout the remainder of the year. This package, together with our satellite broadcasts and other Service/Agency-hosted training events, support our continuing education policy of 80 hours every two years.

We are experiencing many successes in acquisition and logistics reform, but much can still be accomplished. Acquisition and Logistics Reform Week will enable us to further embrace the Revolution in Business Affairs, and take the next step in providing better, faster, and less expensive products to our customers.

J.S. Gansler

Editor's Note: This information is in the public domain at **http://www.acq.osd.mil/ar/#sat1**. To learn more about ALR Week 2000, go to **http://www.acq.osd.mil/alrweek2000/** on the World Wide Web..



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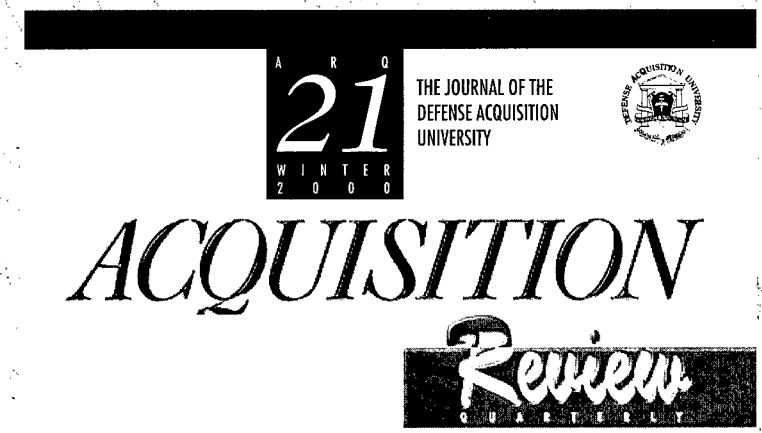


Reliability Means Performance

Three Recommendations for Program Managers

CAPT. RAVI I. CHAUDHARY, U.S. AIR FORCE

"We can't afford to wait until OT&E [Operational Test and Evaluation] to evaluate system reliability. We need to use system models and testing early enough [before OT&E] to influence the design before changes become too costly."

—Dr. George Wauer
Deputy Director for C3I & Strategic Systems
DOT&E, OSD

In today's streamlined acquisition environment, multi-functional Integrated Product Teams, or IPTs, are challenged with developing and fielding cutting-edge technology to meet warfighter requirements. Design teams focus on maximizing performance factors such as top speed, max payload, and target accuracy. IPTs are also concerned with system reliability, or the ability of a system to successfully perform its intended function over a period of time. As the debilitating effects of poor system reliability become more evident to system developers they, in turn, place more and more emphasis on system reliability.

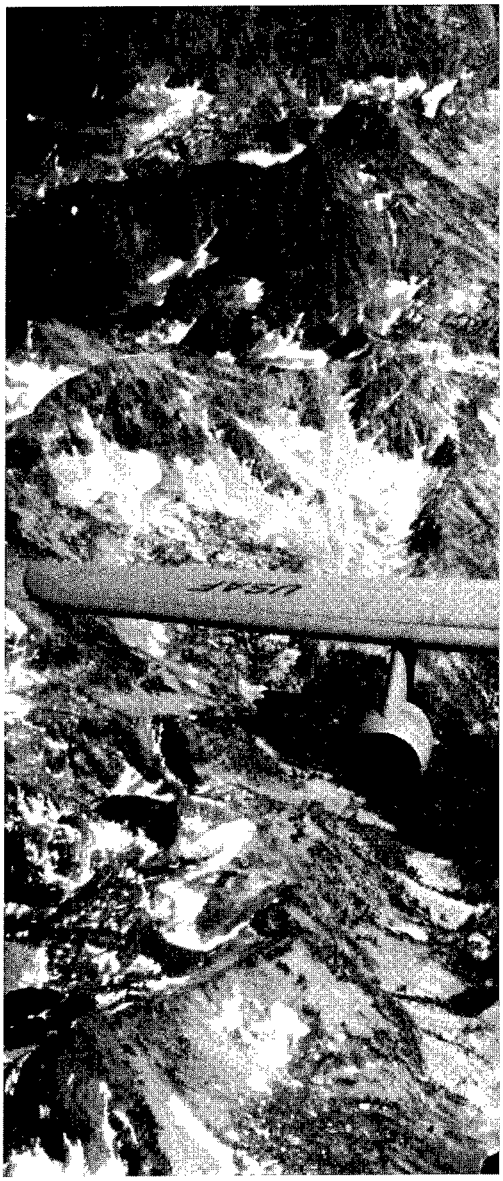
Moderate Success to Borderline Disaster

Currently, logistics and supportability IPTs address most issues related to reliability. The effects of addressing reliability within logistics and supportability IPTs generally range from moderate success to borderline disaster. Early fatigue in structures, high failure rates in electronic components, and erratic software performance are just a few component-related problems encountered while fielding new weapon systems.

The seemingly unpredictable nature of reliability stems from a variety of ways IPTs apply the fundamentals of reliability in systems design. Programs that *isolate* reliability engineering to only the logistics IPT (or any other single IPT, for that matter) eventually pay thousands, and even millions of dollars in system repairs, reworks, and component replacements. In essence, this approach may be addressing reliability *symptoms* rather than the *source* of reliability.

On the contrary, programs that *release* reliability from the confines of a single IPT, and address reliability as the result of robust engineering methods experience tremendous success.

Reliability, when regarded as a key performance factor for a system, results in millions of dollars in life cycle cost savings for acquisition programs. This is not to say that logistics and supportability are unimportant to the acquisition process. Logistics and supportability are extremely important to system effectiveness, and are directly affected by sys-



Chaudhary *is the lead C-5 flight test engineer in the Test and Evaluation Flight, 339th Flight Test Squadron, Robins AFB, Ga., supporting state-of-the-art avionics integration for C-5, C-130, and C-141 aircraft. As a NASA Graduate Research Engineer, he also supports Marshall Space Flight Center in the research, development, and test of the first ever on-orbit space debris repair system for the $40-billion International Space Station. A NASA Graduate Fellow, Chaudhary holds a bachelor's in Aeronautical Engineering from the U.S. Air Force Academy and a master's in Industrial Engineering from St. Mary's University.*

tem reliability. However, designing for reliability also serves a crucial role in system development, since the *true* source of system reliability rests in robust materials, environmental resilience, redundant system architecture, robust manufacturing processes, and assembly techniques. In fact, similar design characteristics also affect "traditional" performance factors such as payload, max speed, and accuracy.

So why isn't reliability regarded by IPTs in the same light as traditional performance factors? In this article, I propose reliability as a key performance characteristic of a system. I also propose three low-cost recommendations to ensure program managers field reliable systems.

What is Reliability?

Without getting into complex mathematical derivations, let's presuppose a working definition of the term "reliability."

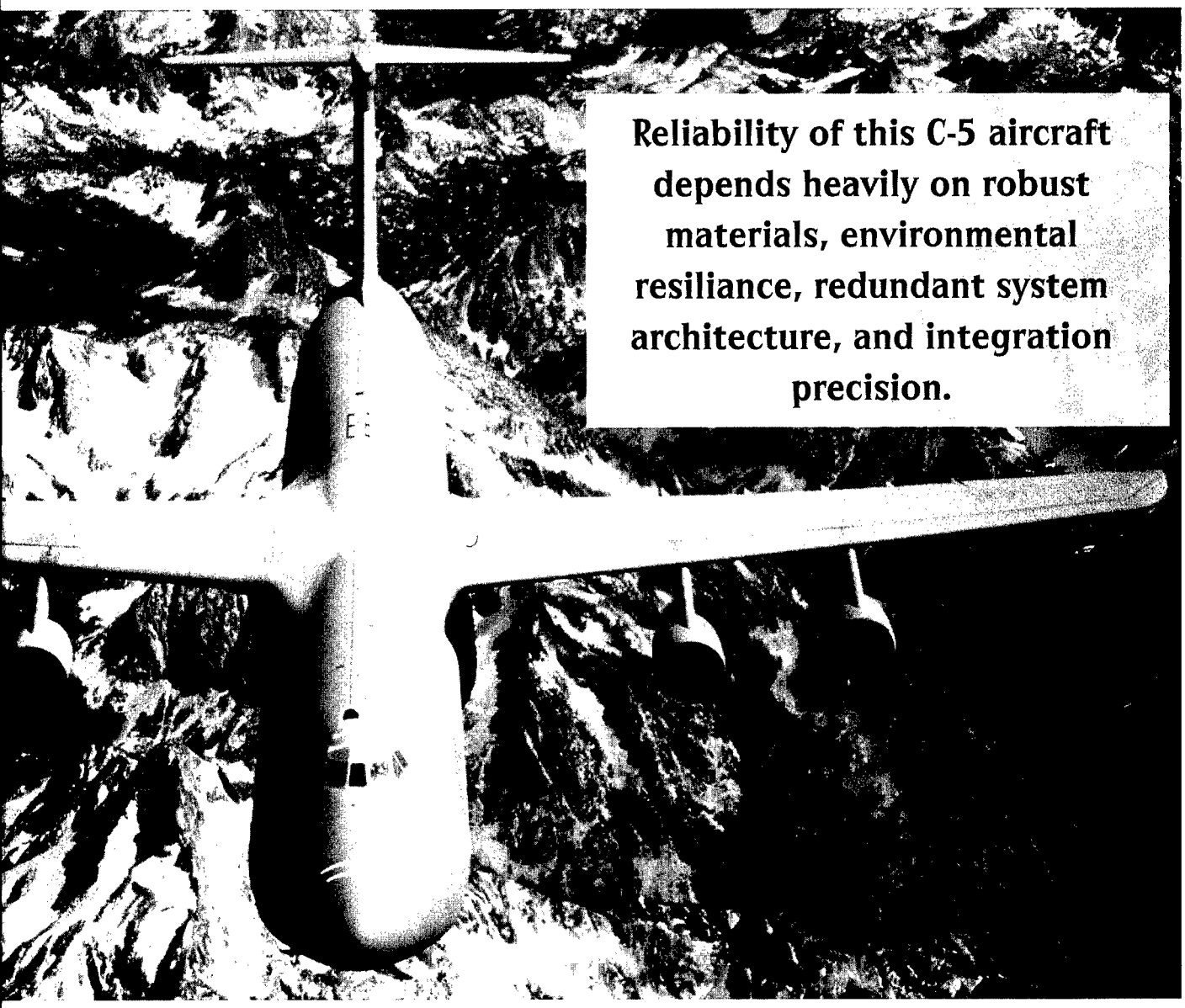
> *The reliability of a system is the probability that, when operating under stated environmental conditions, a system will perform its intended function adequately for a specified interval of time.*

From this definition, we establish reliability as a probability, and a function of time. Further, we can also assume that the reliability of a system deteriorates over a given period of time. Reliability also assumes the identity of probability distributions. One of the more commonly used probability distributions used to model reliability is the exponential distribution, written as:

$$R(t) = e^{-\lambda t}$$

Where R is reliability, λ is 1/(Mean Time Between Failures), and t is time. From the mathematical definition, we see that for an exponential distribution, reliability is a function of time and Mean Time Between Failures, or MTBF. MTBF is defined as the mean time a system will successfully perform its intended function. This is a key parameter used in measuring reliability.

Another concept pertaining to reliability is redundancy. System redundancy



Reliability of this C-5 aircraft depends heavily on robust materials, environmental resiliance, redundant system architecture, and integration precision.

DoD photo by Senior Airman Steve Thurow

is achieved by using multiple subsystem components connected in order to increase reliability. Redundancy can be achieved by using several methods. The first method is achieved by connecting systems in series (Components A-C, bottom chart). In a series system, all individual components must operate if the system is to function. Connecting subsystems in series tends to decrease reliability, since the reliability of the entire system is equal to the product of the individual reliabilities of that system.

A more common method of redundancy is achieved by connecting components in parallel (Components D-F). A parallel system is a system that is not considered to have failed unless all components have failed. Achieving redundancy using parallel systems is a standard practice and generally increases system reliability when more parallel components are added. In system design, a combination of series and parallel systems within the overall architecture is commonplace. In fact, a combination of both types of systems is almost unavoidable. Once systems engineers determine the reliability of individual components, overall system reliability can be empirically calculated.

Sources of Reliability Information

Now that we've reviewed key concepts in reliability, let's explore the methods of determining reliability. At the component level, reliability can be determined from a variety of sources.

Lab

Many component reliability values are determined by operating the component in laboratory environments. In the lab, time-to-failure data are collected and analyzed for possible design improvements. Unfortunately, lab data can sometimes prove to be inaccurate when the component is integrated with another system.

Field

Another source of component reliability is the historical failure rate of components already operating in the field. While this may provide valid data for a given system, the reliability data may prove to be different when the component is integrated with a new system that operates in a different environment (i.e., different temperature, stress level, or number of cycles).

Modeling and Simulation

Other sources of reliability information include mathematical modeling, computer simulation, or performance of similar components. These methods provide early insight into reliability performance, but must be validated with actual field data. But what determines whether a particular component is reliable or unreliable?

True Source

The true source of system reliability rests with the *performance of individual components and subsystems*. Raw materials, structural make-up, complexity, functional characteristics, manufacturing precision, and assembly processes all determine the ability of a system to complete its intended function. In short, the longer a system's components will last, the longer the system will last! Herein lies the rationale for directing reliability practices toward design criteria that traditionally impact other performance areas (i.e., material development, component selection, system architecture, or manufacturing and assembly processes).

So how do IPTs apply reliability in engineering design in order to bring about system improvements? I propose three low-cost recommendations for regarding reliability as true performance criteria in system development.

Recommendation No. 1

Develop a reliability development program early.

If IPTs are to ensure robust system reliability, a comprehensive reliability development program must be established prior to Milestone 0. Form a reliability action design team consisting of reliability engineers, systems engineers, manufacturing engineers, and other applicable engineering disciplines (i.e., structural, human factors, electrical, and aeronautical). Include multifunctional representation from users, program management, contractors, and others. Involve the reliability team in the requirements process, and establish a charter with concrete reliability goals. Develop measurable goals and an overall plan geared toward achieving success.

Recommendation No. 2

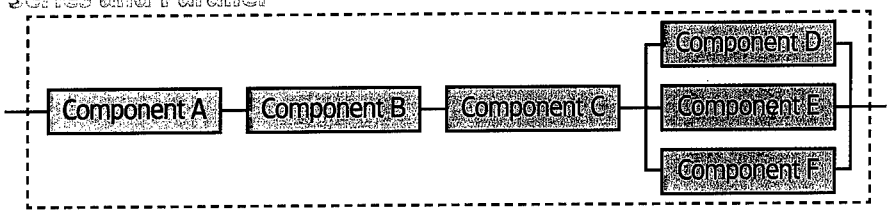
Carry the process further by developing and including reliability goals for major subsystems.

As design teams take ownership of individual subsystems (structures, software, electrical, and controls), these teams should also be responsible for developing subsystem reliability goals and including those values in requirements documentation. The design team should, in turn, report this information to the reliability action team to determine overall system reliability goals.

To meet their reliability goals, the subsystem design team should also concern themselves with subsystem design considerations. Design teams may have to consider one or more of the following factors, and their cumulative impact on subsystem reliability:

- Complexity of the Design
- Raw Material Selection
- Environmental Effects
- Dimensional Tolerances
- Level of Manufacturing Automation and Process Control

Overall System Consisting of Components Connected in Series and Parallel



- Workmanship and Precision Tooling
- Assembly Techniques
- Quality of Off-the-Shelf Components.

Of course, determining how sensitive reliability is to a given design consideration is a challenging undertaking, especially prior to the development of subsystem prototypes. In fact, evaluating initial reliability data is such a difficult task that design teams believe the exercise is non-value-added. To overcome this challenge, the next recommendation proposes a strategy consisting of reliability modeling and validation.

RECOMMENDATION NO. 3
Develop methods for evaluating reliability goals and validate the methods as the system matures.

At this point, our reliability action team has developed overall reliability goals, subsystem goals, and has made design decisions that will achieve these goals. Should the program manager wait until Operational Test and Evaluation (OT&E) to determine if reliability goals are met? I've attended program meetings where members were convinced that reliability could only be evaluated during or after OT&E. This mindset, although effective at the time, usually results in costly design changes, configuration control problems, poor field reliability, and frustrated users.

On the contrary, effective reliability analysis, modeling, and evaluation can be accomplished *prior* to OT&E, especially when historical reliability data exist on the majority of the components chosen in the design! In today's climate of reduced budgets and downsizing, we can ill afford to wait until OT&E to start reliability test and evaluation. High reliability can be achieved with measurable reliability goals and a progressive plan toward achieving those goals.

During initial design reviews (reviews where raw materials, sub-system makeup, initial architecture, and components are chosen), engineers may use a variety of methods to predict the reliability of sub-systems. For components already developed and in use, research can reveal the historical reliability of components. Field and lab data from other applications can serve as a basis from which to determine component reliability values. Developers must scrutinize environmental operating conditions of components and match these conditions as closely as possible.

Most component manufacturers track failure rates and MTBF information on all of their products. If the component has never been manufactured before, analyze the materials used for the component. Predict the reliability of the new component by researching components manufactured using the same or similar materials.

Once the design team establishes baseline reliability values, they can then report their findings to the reliability action team. This information can be checked against requirements documents in order to predict, with reasonable fidelity, if reliability goals are being met.

Once individual subsystem prototypes are built, laboratory tests can determine if previous reliability predictions are correct. Prior to the tests, design teams should understand all applicable assumptions (realistic number of cycles, environmental conditions, and test unit limitations). If an effective laboratory test cannot be accomplished, team members may have to draw conclusions based upon known data. (Note that at this point no working system prototypes have been built, yet the design team has found independent sources of reliability that can be compared to system reliability goals.)

Once prototype subsystems are fabricated, use the same methods of reliability prediction to determine if reliability goals are met. Software integration laboratories, mechanics laboratories, environmental chambers, and wind tunnels are excellent examples of facilities that can be used to evaluate sub-system reliability. Unfortunately, this type of testing can prove to be costly, given the amount of runs required to produce component failure. Therefore, design teams may opt to calculate their aggregate reliability values using individual component reliability values.

Design teams may also narrow the list of subsystem reliability tests to include only the most critical subsystems. Whatever the subsystem, a method of collecting failure data must be established once prototype developmental testing begins.

Contrary to the traditional viewpoint that reliability testing can only be accomplished during OT&E, initial prototype Developmental Test and Evaluation (DT&E) provides an excellent opportunity to collect failure data. During DT&E, the system is considered immature. Production facilities and manufacturing methods are not yet established. During DT&E, tests demonstrate that specified system requirements are met. So why can't sub-system reliability data be collected?

A case can be made that DT&E traditionally is not long enough in duration to collect statistically significant reliability data. This is a valid point. However, neglecting to collect and track component reliability data would prevent design teams from discovering useful trends. If reliability data are tracked on critical components, trends may be detected that identify potential design improvements. Without a focus on reliability trends, repeat component replacements would be identified in OT&E or after fielding, where design changes and configuration control are more difficult.

Component failure indications during DT&E can also provide clues early in the developmental process in order to make design changes and provide focus areas for OT&E. For example, are soldering processes precise enough for the given failure rate of a component, or will they fail earlier than expected? Are materials robust enough to withstand the environmental conditions? Should OT&E include additional runs in extreme operational environments?

During OT&E, the system is evaluated in order to ensure its operational re-

quirements are met. From a reliability standpoint, sub-system and component MTBF are recorded. At this point, production and manufacturing processes may already be established. Major redesign efforts are complete, and the system performs in its operational environment. Major changes to processes or materials may be infeasible, time consuming, or costly. Attention to reliability performance in earlier phases of development should theoretically reduce the possibility of major redesigns.

Nevertheless, OT&E provides a snapshot of overall system reliability. Frequent subsystem failure rates during OT&E should serve as a sign that reliability will decrease once the system is fielded. Design teams should thoroughly analyze failures, root causes, and their impact once fielded. Hopefully the reliability action team has evaluated the system, and the risk of low reliability after fielding the system is mitigated.

OT&E Is Not the End

Reliability focus does not end with OT&E! Once the system is fielded, the reliability action team should become a permanent part of sustainment activities. The team should identify critical systems and components where low reliability rates prevent mission accomplishment. Further, investigations should be conducted to answer the following critical questions:

- What sub-systems are degrading the quickest?
- What is the root cause (vendor change, new environmental conditions, or component manufacturing processes)?
- What is the corrective action (component replacement, improved manufacturing, or repair)?

System Reliability Synonymous With Performance

The purpose of this article was to propose the release of reliability design practices from the confines of a single IPT, and address the source of reliability performance at the component and subsystem level. Reliability is a viable performance characteristic, with its roots nested in the quality of components, materials, interfaces, workmanship, and manufacturing processes.

The recommendations in this article may bear a sharp resemblance to design activities conducted for "traditional" performance factors of systems. Regarding *system reliability* as synonymous with the term *performance*, program managers will find that total life cycle costs can be reduced by forming an action team dedicated toward achieving robust "reliability performance."

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DoD High Performance Computing Modernization Program 2000

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The Users Group Conference (UGC) is for and about the users of the DoD High Performance Computing Modernization Program (HPCMP). It is a time when the users can come together to share their computational experiences, technical solutions, and new approaches to solving their problems.

The Year 2000 DoD High Performance Modernization Program Users Group Conference will be held June 5 through June 8 at the Hilton Albuquerque in beautiful Albuquerque, New Mexico.

Registration includes:

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For more information on the DoD UGC 2000, visit the HPCMP Web site at
http://hpcmo.hpc.mil/Htdocs/UGC/index.html.

OASD PUBLIC AFFAIRS NEWS RELEASE

New Defense Procurement Director Named

Under Secretary of Defense for Acquisition, Technology and Logistics Jacques S. Gansler today announced that Deidre A. Lee, currently Administrator of the Office of Federal Procurement Policy (OFPP), has been selected to become the new Director of Defense Procurement. Lee will replace Eleanor Spector, who retired in February.

As Director of Defense Procurement, Lee will be responsible for all matters related to procurement policy in the Department of Defense. This includes directing the Defense Acquisition Regulations Council and developing policy for contract pricing and financing, contract administration, international contracting, and training of contracting personnel. In addition, she will be the principal advisor to Gansler on major weapon system contracting strategies as well as an advisor to the Defense Acquisition Board on procurement matters.

Lee has been the head of OFPP since July 1998. Prior to that, she had been Associate Administrator for Procurement at the National Aeronautics and Space Administration (NASA) for five years. She was awarded NASA's Outstanding Leadership Medal and Exceptional Achievement Medal. In 1996, she was a recipient of the Senior Executive Service Presidential Rank Award.

Lee holds a bachelor's degree in business administration from Central State University, Edmond, Okla., and a master's degree in public administration from the University of Oklahoma. She is expected to begin her new duties at the Pentagon later this month.

Editor's Note: This information is in the public domain at **http://www.defenselink.mil/news** on the Internet.

Teaming Effort Delivers State-of-the-Art Truck to Marines

SUSAN A. BROWN

The Marine Corps took ownership of its first 21st century state-of-the-art truck designated the MK23, at a rollout ceremony held in Oshkosh, Wis., Jan. 19. The development and production of the new truck was made possible through a partnering effort between the U.S. Marines, U.S. Army, and Oshkosh Truck Corp.

From left: Robert J. Bohn , President and CEO, Oshkosh Truck Corp., greets Marine Brig. Gen. James M. Feigley, Commander, Marine Corps Systems Command in front of an MTVR

A Joint Remanufacturing Effort

The Medium Tactical Vehicle Replacement (MTVR) program is unique because it began as a joint remanufacturing effort between the Army and Marines, which eventually evolved into a new vehicle for the Marine Corps.

As the lead Service, the U.S. Marines under the direction of Marine Lt. Col. Thomas Manley, PM-Transportation Systems, Marine Corps Systems Command, Quantico, Va., is responsible for program oversight and management of the program under the policies and procedures set forth by the Department of the Navy.

In addition, all acquisition, contractual, engineering, quality, and test and evaluation actions are directed by product manager, Army Lt. Col. Walter Raymond Jr., under the Program Executive Office, Ground Combat and Support Systems (PEO-GCSS), Warren, Mich.

The competitive selection one year ago of the Oshkosh Truck Corp. as the production contractor marked the beginning of a successful joint relationship with the mission of acquiring the best MTVR system possible, within program cost and schedule, to replace the U.S. Marines' medium tactical wheeled vehicle fleet. The Partnering relationship, according to all involved, contributed significantly to production of a quality system that meets performance requirements, reduces life cycle cost, and improves the Marines' warfighting capability. The contract calls for the production and delivery of 5,666 vehicles and includes options for an additional 2,502 vehicles.

Rollout Ceremony at Oshkosh

The Oshkosh Truck Corp. hosted a first-class ceremony featuring guest speakers Marine Brig. Gen. James M. Feigley, Commander, Marine Corps Systems Command; Robert Bohn, President and Chief Executive Officer, Oshkosh Truck Corp.; and Paul Hollowell, President of Defense Business, Oshkosh Truck Corp. Representing PEO-GCSS, Raymond spoke on behalf of Army Maj. Gen. John Michitsch

Signed, Sealed, and Delivered

The highlight of the ceremony was the signing of the first Material Inspection and Receiving Report (DD 250) by Army Col. Anita Moyer, commander, Defense Contract Management Command, Chicago; and a ribbon cutting by Feigley, Raymond, and Bohn to commemorate the rollout. The ceremony was also

***Brown** is a program analyst for the U.S. Marine Corps PM-Medium Tactical Vehicle Replacement (MTVR) program. She holds a master's degree in Public Administration from Central Michigan University and is a Certified Level III acquisition professional in Program Management; and Business, Cost Estimating, and Financial Management. She is a graduate of APMC 98-2, DSMC.*

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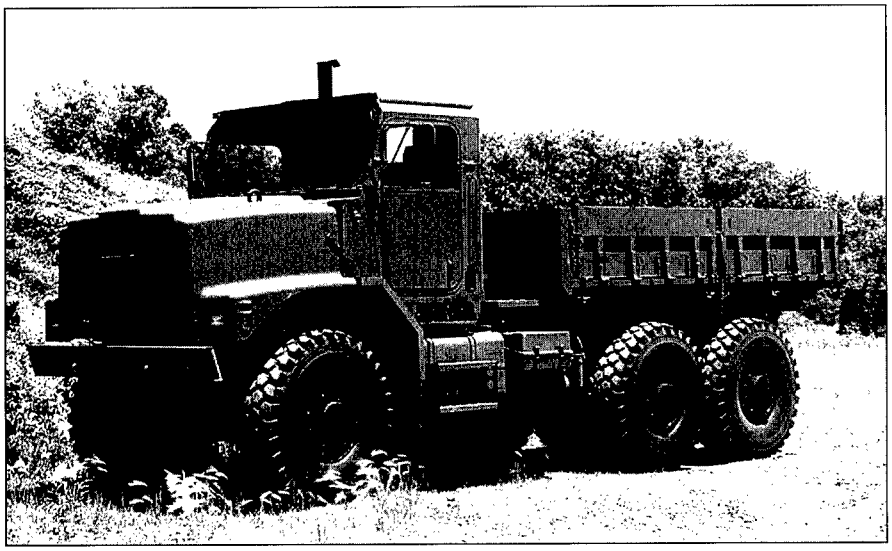


The Medium Tactical Vehicle Replacement (MTVR)

attended by a representative of the Wisconsin Governor's office who congratulated Oshkosh Truck on behalf of Wisconsin Gov. Tommy G. Thompson.

Additional guests included Dan Cox, Professional Staff Member, Senate Armed Services Committee; individuals from the offices of two U.S. Representatives; and many other government and industry personnel.

Technological Superiority

The MTVR evolved from an advanced-technology demonstrator, inexpensively built and tested through a joint government/industry effort to a validated systems concept. The MTVR program goal for the U.S. Marines is to field a cost-effective, state-of-the-art system to replace its existing fleet of M809 and M939 series of 5-ton medium tactical trucks. Production is scheduled from fiscal 1999 through fiscal 2003.

A technologically superior vehicle, the MTVR offers cargo capacities of 7.1 tons off-road and 15 tons on-road. Its increased agility and mobility over diverse terrain is well suited for the expeditionary nature of Marine Corps' missions. A Central Tire Inflation System (CTIS) and six-wheel Oshkosh modular-independent suspension combine to support the 70-percent off-road requirements.

Life Cycle Cost Reduction

Life cycle costs are significantly reduced as the MTVR performance specification requires a 22-year vehicle life with no midlife depot rebuild. An aggressive 22-year anti-corrosion requirement further contributes to the extended life of the vehicle. Adoption of the prime Contractor Logistics Support (CLS), Interactive Electronic Technical Manuals (IETM), systems simulators, and computer-based learning will strengthen supportability, cut diagnostic troubleshooting efforts, facilitate operator and maintenance mastery of occupational skills, while slashing system support costs and enhancing readiness.

Nine Years in the Making

Raymond addressed the audience on behalf of Michitsch proclaiming, "...Today is a culmination of nearly nine years of effort, to provide the Marine Corps a high-performance, cost-effective medium truck for the future ... This truck's success and capabilities," he continued, "are a direct result of the team's commitment and dedication to making the MTVR the medium truck of the future."

Sharing Responsibility

Feigley delivered inspirational remarks connecting all those individuals building the truck to the Marine who will ultimately become the end user. On behalf of all Marines, he honored those who built "...the finest piece of equipment of its type in the world." He emphasized the trust that the Marine Corps has in Oshkosh Truck Corp. and that a connection with each Oshkosh employee who worked on the MTVR follows the truck wherever it's deployed ... That connection," Feigley continued, "now extends back to this very place. When you deliver this truck, and the thousands to follow, you will now share some of that responsibility for our success or failure. When you make things for the Marines you are connected, and I wanted to remind you of that."

Future Systems Development

The MTVR will undergo performance and operational testing from February through August 2000. A follow-on research and development contract for vehicle variants has been awarded to study the feasibility of producing wreckers and dump trucks that will be welcome additions to the Marines' fleet of vehicles through the year 2000 and beyond.

Editor's Note: The author welcomes questions or comments on this article. Contact her at **BrownS@tacom.army.mil.**

OASD PUBLIC AFFAIRS NEWS RELEASE

FY2000 Advanced Concept Technology Demonstrations Announced

Under Secretary of Defense for Acquisition, Technology and Logistics Dr. Jacques S. Gansler announced 11 new Advanced Concept Technology Demonstration (ACTD) programs for fiscal year 2000. The ACTD is a conduit for evaluating mature advanced technology and transitioning that technology which demonstrates military utility into the hands of the warfighter.

Over 39 program proposals were submitted by the military services, theater commanders, and Joint Staff. Representatives of the military services and unified commanders reviewed the list of proposals and provided their recommendations to the Joint Requirements Oversight Council (JROC) and Office of the Secretary of Defense staff. An outstanding group of finalists has been selected to start in fiscal year 2000. Selection was based on alignment with the overall concepts detailed within Joint Vision 2010; these candidates directly support the Chairman of the Joint Chiefs of Staff's warfighting vision of the future. The ACTD process is providing a means to address critical military needs with mature advanced technologies.

Descriptions of the ACTDs selected for initiation in fiscal year 2000 are shown below. More information on ACTDs can be accessed at **www.acq.osd.mil/at/**.

Editor's Note: This information is in the public domain at **http://www.defenselink.mil/news**.

FY 2000 ACTDs

CINC 21: Improves the Commander in Chief and the Joint Force operational commander's ability to conduct crisis action planning.

Coalition Aerial Surveillance and Reconnaissance: Develops interoperability protocols and concept of operations to enhance joint strike capability of U.S. and allied forces.

Communications/Navigation Outage Forecasting System: Forecasts ionospheric conditions to limit effect of satellite transmissions disruption/outage.

Computerized Operational Measurements and Signatures Intelligence (MASINT) Weather: Supports precision guided munitions, strike warfare, fleet defense, air refueling and reconnaissance through near weather data.

Content-Based Information Security: Develops a proof-of-concept security environment supporting joint and coalition forces to evolve security policy; tactics, techniques and procedures; and technical requirements.

Ground to Air Passive Surveillance: Uses commercial transmission signals to detect, track, and identify platforms.

Joint Intelligence, Surveillance and Reconnaissance: Enables commanders to simultaneously access all available tactical sensor data to enhance battlespace picture.

Multiple Link Antenna System: Develops wide-band information system to facilitate multiple lines of wireless communications to a single tactical platform.

Quick Bolt: Integrates multiple guidance technologies into the High-Speed Anti Radiation Missile (HARM), which will aid in the destruction of enemy radar threat systems.

Restoration of Operations: Restores operations at a port, airfield, or logistical node that has been attacked by chemical or biological weapons.

Tri-Band Antenna Signal Combiner: Utilizes multiple smaller, lighter, and cheaper antennas to provide the performance of much larger antennas for special operations forces.

OASD PUBLIC AFFAIRS NEWS RELEASE

Nunn-Perry Awards for Small Business Mentor-Protégé Program Announced

Twelve teams of Department of Defense prime contractors and their protégés from small, disadvantaged businesses [were] honored with the Nunn-Perry Award during the 6th Annual DoD Mentor-Protégé Conference, held March 15-17 in Arlington, Va.

This award is named in honor of both former Senator Sam Nunn, who sponsored legislation to create the Defense Department's Mentor-Protégé Program, and former Secretary of Defense William Perry in recognition of his implementation of the program.

The Nunn-Perry Award recognizes mentor-protégé teams that have excelled in technical developments, cost efficiencies, and increased business opportunities for small disadvantaged firms.

The DoD's Mentor-Protégé Program, which began in 1991, is a national initiative to encourage large defense contractors to develop the technical capabilities of small disadvantaged businesses. It also qualifies organizations employing the severely disabled to compete more effectively for defense-related work. The Department's program has served as a model for other government agencies. More information on the program is available at the program's Web site, **http://www.acq.osd.mil/sadbu/mentor_protégé**.

This year's 12 recipients, by team, are shown below.

Editor's Note: This information is in the public domain at **http://www.defenselink.mil/news.**

Nunn-Perry Award Winning Teams

- The Boeing Company, Mesa, Ariz., and Technology Management Inc., San Diego, Calif.
- Computer Sciences/Raytheon, Patrick Air Force Base, Fla., and Data Voice, Palm Bay, Fla.
- Lockheed Martin Missiles and Fire Control, Orlando, Fla., and T/J Technologies Inc., Ann Arbor, Mich.
- Northrop Grumman Corp., Electronic Sensors and Systems Sector, Huntsville, Ala., and The ENSER Corp., St. Petersburg, Fla.
- Advanced Resource Technologies Inc., Alexandria, Va., and Triumph Technologies, Alexandria, Va.
- The Boeing Company, St. Louis, Mo., and Manufacturing Technology Inc., Fort Walton Beach, Fla.
- Greenhorne & O'Mara Inc., Greenbelt, Md., and Utility Automation 2000 Inc., Huntsville, Ala.
- Lockheed Martin Missiles and Fire Control, Dallas, Texas, and Tecnico Corp., Chesapeake, Va.
- Northrop Grumman Corp., Integrated Systems and Aerostructures Sector, Dallas, Texas, and Mandaree Enterprise Corp., Mandaree, N.D.
- The IT Group, Alpharetta, Ga., and Deerinwater Environmental Management Services Inc., Norman, Okla.
- Science Applications International Corp., Oak Ridge, Tenn., and American Technologies Inc., Oak Ridge, Tenn.
- Raytheon Systems Co., Dallas, Texas, and RS Information Systems Inc., McLean, Va.

AIR FORCE NEWS SERVICE

Information Assurance Vital in 21st Century

SENIOR AIRMAN A.J. BOSKER

WASHINGTON -- Information Assurance [IA] is crucial if the Defense Department hopes to confront the potential for cyber aggression and meet the challenges of the 21st century, Maj. Gen. Thomas B. Goslin Jr., Director of Operations, U.S. Space Command [USSPACECOM], told the Senate Emerging Threats and Capabilities Committee March 1. To do so means placing special emphasis on the importance of defending our information systems, he said.

According to the general, a broad range of threats exists to DoD information infrastructure and its ability to maintain information superiority. Furthermore, USSPACECOM has become increasingly aware of certain vulnerabilities inherent in current defense information infrastructure.

"Our concern is heightened because any adversary will look for ways to exploit our vulnerabilities and most likely apply strategies to attack our defense networks and reduce the United States' ability to maintain information superiority," he said. "We believe that cyber aggression, as part of an adversary's overall strategy, may occur well in advance of any direct hostilities and last throughout any conflict."

Goslin said the formal move to place the responsibility for Computer Network Defense [CND] under a single command, USSPACECOM, highlights the recognition that DoD must rapidly improve joint operations in order to protect and defend critical defense information infrastructure.

"Protect and defend," he said, includes a range of activities from establishing DoD policy, collecting capabilities and procedures, and conducting defensive operations to develop and employ methods and capabilities against cyber aggression.

And that is exactly what USSPACECOM has been doing for the last five months since assuming global responsibility for CND, Goslin said.

"We have focused a tremendous amount of effort to normalize and operationalize CND across DoD and enhance information assurance," he said. "Computer Network Defense is a key element of IA and must be carried out at all levels within our information systems.

"We know a risk accepted by any one part of our network is a risk imposed on all parts of our network," Goslin said. "We believe our defense information networks must be developed, operated, and sustained just like any other weapons system.

"Information assurance is the responsibility of everyone who operates or uses a DoD network. "

Editor's Note: This information is in the public domain at **http://www.af.mil/news**.

YOU ARE INVITED!

Interested DoD–Industry Personnel, DSMC Graduates, Faculty, Staff

The Capital Area Chapter, Defense Systems Management College Alumni Association (DSMCAA) sponsors monthly "brown bag" acquisition seminars on timely acquisition subjects, featuring experts in the subject area. Seminars are open to interested DoD personnel; DSMC graduates/alumni and faculty; and DoD contractor personnel, subject to prior notification of attendance. Seminars are normally scheduled on the fourth Monday of each month from 11:30 a.m. to 12:45 p.m., and are held at the following *new* location:

ANSER, Inc.
Conference and Innovation Center
Suite 700
1550 Wilson Blvd.
Rosslyn, Va. 22209

Individuals planning to attend a seminar should E-mail Tod Beatrice at **beatrict@anser.org** or call (703) 588-7747 no later than one work day prior to the seminar. If replying by voice mail, please provide your name, company/organization, and phone number.

To learn more about the great benefits of DSMCAA membership, visit the DSMCAA Web site at **http://www.dsmcaa.org.**

Commercial Operations and Support Savings Initiative (COSSI) Proposals Due by May 17

Leveraging Commercial Technologies to Reduce the Operations and Support Costs of Military Systems

The Commercial Operations and Support Savings Initiative (COSSI) is a joint program of the Army, Navy, and Air Force. This announcement seeks proposals from firms with a concept for inserting commercial technology into a fielded military system for the purpose of lowering the system's operation and support (O&S) costs. COSSI's mission is to develop and test a method for reducing Department of Defense (DoD) O&S costs by routinely inserting commercial items into fielded military systems. The insertion of commercial items is expected to reduce O&S costs by reducing the costs of parts and maintenance, reducing the need for specialized equipment, increasing reliability, and increasing the efficiency of subsystems. COSSI is a two-stage program. The first stage is the cost-shared adaptation, development, and testing of a prototype based on a commercial item. The second stage is the acquisition and installation of the prototype into a fielded military system. Proposals should be a clear summary of your COSSI idea -- what you intend to do and how it will save the DoD money. Proposals are due by 4:00 p.m. Eastern Standard Time, May 17, 2000. Complete program information is included in a document entitled, "Program Description for the Commercial Operations & Suport (O&S) Savings Initiative" Announcement No. 00-94058 dated Feb. 7, 2000. You are strongly encouraged to obtain the document in order to understand the program and submit a meaningful proposal. You may download this document from the Internet (**http://www.acq.osd.mil/es/dut/** or **www.nslc.navsea.navy.mil/cossi/cossi.nsf**); or request this document by phone: (703) 681-5457; or by mail addressed to: COSSI Program Office, 5203 Leesburg Pike, Suite 1403, Falls Church, Va. 22041; or by electronic mail: Internet address: **cossi@acq.osd.mil**. For further information for news media, contact Navy Lt. Cmdr. Anthony Cooper at (703) 697-3189.

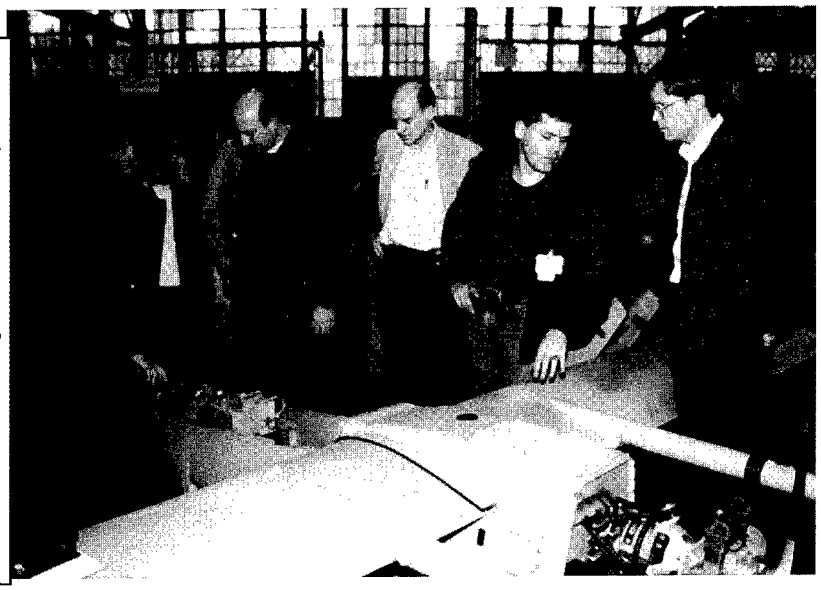
Editor's Note: This information is in the public domain at **http://www.acq-ref.navy.mil/** on the DoN Acquisition Reform Web site.

A Real-Life Approach to Intermediate Systems Acquisition

DSMC Distance Learning Course Developers Explore UAV Acquisition

KARI M. PUGH

Course developers at the Defense Systems Management College (DSMC) stepped into the real-life world of the acquisition workforce with a recent trip to the Patuxent River Naval Air Station (NAS) at Patuxent River, Md. Examining the continuing development of Unmanned Aerial Vehicle (UAV) systems, they spent a full day talking to busy program management executives from the office of Program Executive Office, Cruise Missiles and Joint Unmanned Aerial Vehicles (PEO-CU).



Touring Aircraft Intermediate Maintenance Department, Patuxent River NAS, Md. From left: Frank Ferney, Director, Pioneer CFA, Naval Air Warfare Center Aircraft Division (NAWCAD); Julian Hart, CTI, ISAC-DL Design Team; John Bennett, DSMC, ISAC-DL Design Team; Larry Louden, Tech. Rep., AAI/ESI; Kurt Rowley, ISAC-DL Design Team.

After touring the UAV support facilities, they walked away with insights to support the redesign of a popular Defense Acquisition University course. The January field trip to Patuxent River NAS was designed to help course developers learn about UAV systems and the true challenges facing today's defense acquisition teams. The goal for DSMC course developers is to present a realistic example of an acquisition program throughout the Intermediate Systems Acquisition Course – Distance Learning (ISAC-DL) to illustrate key acquisition concepts. The new ISAC-DL course uses a hypothetical UAV acquisition program as the instructional foundation, and the trip was designed to answer questions the course development team had about real-world UAV acquisition issues.

The new ISAC-DL course provides journeyman-level members of the defense acquisition workforce a comprehensive view of the Department of Defense (DoD) systems acquisition management process. Class material covers managerial, technical, and business aspects of systems acquisition. Upon completion of the course, students are better prepared to work on integrated product teams supporting acquisition programs.

From left: Frank Ferney, Director, Pioneer CFA, NAWCAD; Andrea Garcia, Course Director, ISAC-DL Course, DSMC.

The Pioneer UAV program at Patuxent River provided a first-hand look at issues that an ever-changing, modern acquisi-

Pugh *is a part-time editor for* Program Manager *magazine and a regular staff reporter for the* Free Lance-Star, *Fredericksburg, Va.*

Photos by Richard Vigue

Visit and discussions at Aircraft Intermediate Maintenance Department, Patuxent River NAS. From left: Frank Ferney, Director, Pioneer CFA, NAWCAD; Julian Hart, CTI, ISAC-DL Design Team; Wayne Glass, BRTRC, ISAC-DL Design Team; Bill Bahnmaier, DSMC, ISAC-DL Design Team; Larry Louden, Tech. Rep., AAI/ESI.

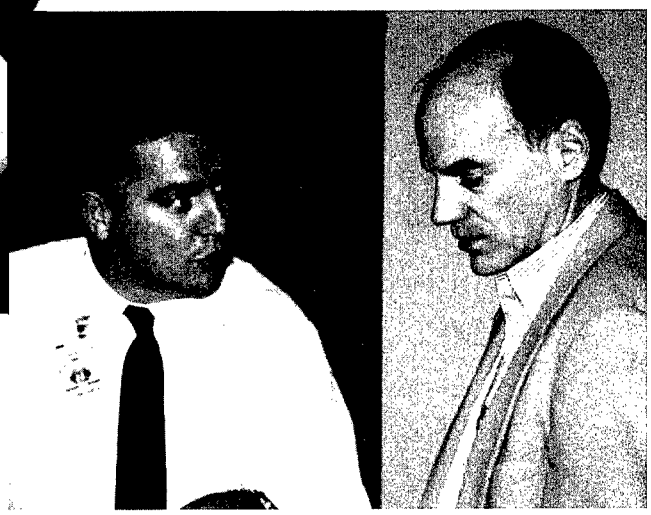
tion workforce must address regarding current acquisition policies and procedures taught in the ISAC-DL course. "My motivation is to involve the students as much as we can," said Course Director Andrea Garcia. "We want exposure to real-world programs to make the course more relevant, interesting, and meaningful."

DSMC course developers spent hours asking questions of PEO-CU's Deputy, Greg Catrambone, UAV Deputy Program Manager, PMA-263, Steve Hogan, and

Visit and discussions at PEO-CU, Patuxent River NAS. From left: Bill Bahnmaier, DSMC, ISAC-DL Design Team; Navy Cmdr. Randall Short, PEO-CU.

Navy Cmdr. Randall Short from PEO-CU before taking a tour of the Pioneer UAV maintenance facility and a close look at each component of the Pioneer UAV system. For now, Pioneer remains the DoD's only marinized UAV to support worldwide contingency operations. To date,

Visit to Aircraft Intermediate Maintenance Department, Patuxent River NAS. From left: Frank Ferney, Director, Pioneer CFA, NAWCAD; Bill Bahnmaier, DSMC, ISAC-DL Design Team; Julian Hart, CTI, ISAC-DL Design Team; John Bennett, DSMC, ISAC-DL Design Team.



Visit and discussions at PEO-CU, Patuxent River NAS. From left: Stephen Hogan, Deputy Program Manager, PMA-263, PEO-CU; John Bennett, DSMC, ISAC-DL Design Team.

Pioneer air vehicles have logged over 15,000 flight hours with the U.S. Navy, U.S. Marines, and the U.S. Army.

The Pioneer system provides real-time intelligence and reconnaissance capability to the field commander. The highly mobile system also offers high-quality video imagery for artillery or naval-gunfire adjustment, battle-damage assessment, and reconnaissance over land or sea.

DSMC officials offered a long list of questions for Patuxent's UAV team, spending time on every aspect of the program, from Program Management Office staffing to logistics and cost estimating.

Members from DSMC began the day at Patuxent River by asking about leadership considerations and partnering with contractors. They learned that the UAV command offers several leadership programs, the most popular being the Senior Executive Development Management Program, a three- to five-year assignment that requires rotation, mentoring and high-caliber training at the Darden Graduate School of Business Administration at the University of Virginia.

The UAV Command recently completed several new initiatives aimed at bringing contractors and the government closer together. In addition, the DSMC team learned how and when the UAV Command established its risk management methodology. The Command identified, analyzed, mitigated, and began tracking risks from the beginning, requiring each contractor to identify what they saw as the top 10 risks to the program.

On the much-talked-about topic of cycle time reduction, DSMC officials learned that the UAV Command helped speed up the acquisition process by talking to industry early in the game through such programs as Industry Day and frequent one-on-one sessions.

"They [Industry] essentially helped us develop our performance documentation," Hogan said. "This gave them [Industry] a heads up, as well, in preparing their proposals; and we reduced turnaround time of the proposals." Other topics that surfaced centered on cost estimating methodology, testing and evaluation, as well as issues and difficulties in logistical support.

A trip to the UAV Aircraft Intermediate Maintenance Department located in a Patuxent aircraft hangar on the shores of the Chesapeake Bay followed the meeting at the UAV Program Executive Office. The DSMC team got a hands-on tour of the facility and the Pioneer system, from its sensitive, helmet-sized cameras to its lightweight wings. The 14-foot-long air vehicle is pusher-propeller driven, powered by a 26-horsepower, rear-mounted engine. DSMC officials had a chance to see its streamlined fuselage design and got a look at themselves on camera from the system's videosensors.

"It was great to have you here," Hogan said. "I hope we helped. You want students to learn realistically, but you don't want them going back to the workforce and saying, 'Why are we doing it this way?' That's why this meeting has been good for both of us."

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I enjoyed the article "On the Ethics of Outsourcing" in the November-December issue of *Program Manager*. David Breslin raises some very cogent points. But as one who has sat on both government and industry sides of the table, I believe there are at least two "philosophical" points of ethics that he misses.

One of these is that government exists to do for the people what they cannot do for themselves. Viewed from this perspective, what are the ethics of reserving jobs for the government that can readily be done by others? Is it truly ethical to base make-buy decisions on the criterion of protecting government jobs?

I believe that there should be a clear and compelling case if work is to be assigned to, or remain with, the government. Examples might include 6.1 and 6.2 weapons research (no civilian application to attract private investment); the cannon factory at Watervliet Arsenal, N.Y. (low demand, high infrastructure investment); and certain high-security fields – although it's interesting that nuclear weaponry has been outsourced or GOCO [Government-Owned, Contractor-Operated] from the outset. *Work not meeting this "necessity" criterion should, in virtually every case, be privatized.* It is very difficult to see (other than from a political standpoint) how the criterion can be stretched to include routine depot maintenance.

Secondly, Mr. Breslin rightly addresses the human costs of outsourcing. They are very real. But in my experience, it is too often the government that causes these human costs. The Air Force's usual manner of competing metrology and calibration is illustrative: fixed prices; either no best value criterion or mere lip service to best value; [or] technical merit basically irrelevant (and possibly even counterproductive if seen as rocking the boat).

The result is a straight shoot-out where no offeror dares to bid salaries and benefits higher than Wage Determination floors. The "winner" is the contractor who bids the fewest and least-qualified heads. Service contractors like treating their employees well, but too many times the government quite deliberately makes it impossible. Now just where are the ethics in that?

David A. Appling
Colonel, U.S. Army (Ret.)

Understanding the "Procurement Business Case"

Striking a Balance Between "Following the Rules" and "Thinking Through the Nature of the Deal"

WILLIAM S. KAPLAN

A crucial benefit of the decade of acquisition reform is giving the government more leeway to structure business arrangements with industry in ways that increase the probability that contractors will deliver successful results to government customers. Within these arrangements, or relationships, the government and the contractor generally share a common set of top-level goals. These goals include the achievement of customer satisfaction, program stability, and positive program and financial performance.

Understanding the Business Case

Participants in successful business relationships develop a shared ability to find mutually beneficial solutions to achieve these goals. This requires a strategy that not only focuses upon the areas of performance interest, but also requires real understanding of the business case. For the government, this will likely include reduced total operating costs and performance that meets or exceeds stated performance requirements. For the contractor, it includes a stable program, the generation of positive cash flow and profit, and a satisfied government customer. Contractual strategies not based on a sound understanding of the business case risk incentivizing the wrong behavior and jeopardizing successful delivery of the requirement.

The contracting and acquisition workforce must focus not only on document execution, but also be meaningfully involved in the "front end" of an acquisition – the structuring of the "best deal." To do this successfully, the importance of understanding the business case surrounding the procurement cannot be overemphasized. New approaches are necessary to connect the contracting and acquisition workforce with the information and tools they need. One new approach to consider is *Factor Collaboration*SM – the joint assessment of the influences and factors that impact the structure of a potential business relationship.

Through the disclosure and sharing of information essential to the planning and execution of a successful business relationship, *Factor Collaboration*SM can increase the likelihood that contractors will deliver successful results to government customers. With the acquisition regulations and guidance as the framework, this can be a useful and structured process to assist government and industry jointly in achieving a more comprehensive understanding of the overall procurement business case.

Changing the Mindset – Changing the Culture

The concept of understanding the "procurement business case" as an initial building block of a successful relationship should be embedded within the contracting and acquisition workforce processes. The goal in contracting is not only to issue solid contracts, but also to support the development and execution of an effective business relationship that successfully delivers a product or service.

Defining, Incentivizing, Leveraging

Changing the mindset regarding the definition of a product, service, or deliver-

***Kaplan** is a senior analyst in the Strategies Group at Science Applications International Corporation, McLean, Va. A retired Air Force colonel with 25 years in contracting and acquisition, Kaplan is a Certified Professional Contracts Manager, a National Contract Management Association Fellow, and a graduate of the Program Management Course, Class 88-2, DSMC.*

able begins by changing how the objectives are viewed in their entirety. What is really wanted? The goals of the program can define a "something" or they can define an "output."

For example, consider a services contract where the requirement is for copy services. The deliverable might be expressed as providing x number of copy machines. A better way to express the requirement might be as *x number of copies.* The requirement focuses on the output (the "what") and not the tool by which output is delivered (the "how"). The output is the responsibility of the contractor.

In another example, consider a supply and sustainment contract for an operational system. In many instances, a contract of this type might provide incentives for contractor performance through an award fee. In this example, assume that the contractor's performance meets requirements. Traditionally, award fees in this area might be relatively small and tied to subjective measures, not strongly enough to results; and may not include specific disincentives for poor performance.

The point is this: determining the best approach requires a change in the mutual thinking and understanding of the procurement business case and then effectively applying this knowledge and insight through planned application of an effective incentive strategy.

As an alternative, consider incentivizing the contractor to lower downstream support costs through an early investment in process improvements directed toward improved maintainability of parts and systems. Rather than specifying the specific parts needed, provide metrics that measure successful completion of the requirements for sustainment (e.g., operational readiness rates). If successful, the incentive might be additional periods of performance. If unsuccessful, the penalty might be a reduction in the period of performance.

The fee may not be the most effective incentive for this procurement and this contractor. The motivation of the contractor may not necessarily be instant profit or immediate cash flow, but a long-term relationship in which costs can be stabilized along with the contractor's workforce.

On a larger scope, consider the change in the industry perspective on research and development (R&D). The DoD share of R&D spending is shrinking, and fewer companies are willing to deal with the red tape associated with competing for those shrinking dollars. In fact, the strong economy has created a wave of technology development and gadgetry, and driven companies that might otherwise be interested in military work to more marketable endeavors where there is no question about who can profit from new innovations. The ability of DoD to leverage the commercial industry in the development and integration of new technology into weapon systems that must meet ever-changing threats is absolutely critical. At the same time, incentivizing industry to do business with the DoD when there are other lucrative markets with less stringent "rules of engagement" is becoming more and more challenging. What is the best way to capture this technology and innovation, and how best can DoD achieve this goal?

The point is this: determining the best approach requires a change in the mutual thinking and understanding of the procurement business case and then effectively applying this knowledge and insight through planned application of an effective incentive strategy.

Improving Communication

A path to better understanding is better communication and the formation of

partnerships. In different areas of industry and government, however, many contractors and agencies still do not see themselves as "true partners." This historical relationship between government and industry is a limiting factor in developing new approaches to acquisition problems and common solutions that benefit both parties.

Both government and industry must concentrate on gaining insight into each other's motivation on a given procurement, through an open dialogue that seeks to align the goals of both parties to the maximum extent possible. Building trust is essential to creating and sustaining a successful business relationship.

Improving Leadership

Leadership that is committed to and understands change is necessary at all levels to ensure that "new" or "different" approaches become embedded in the culture. For example, the contracting workforce has not entirely made the transition to thinking of themselves as "business advisors and managers," with a key role in thinking through and proposing solid incentive strategies.

Leadership within all levels of the contracting community is needed to guide and support this role transition. The contracting workforce must be involved in early and meaningful planning that supports the development of the business strategy. If engaged at a later point in the acquisition, the contracting workforce will only be exposed to part of the planning process, with a less-than-ideal-business relationship the result.

Improving Training

Training reinforces the business process that the workforce uses in developing its approach to business relationships with industry. To change the approach, the government must change its culture and training.

The contracting workforce must expand their thinking and understand issues across the acquisition disciplines, moving away from the narrow perspective they have of contracting derived from a culture embedded by training. Training in the schoolhouse and on the job must change the focus of the workforce from "following the rules," to include "thinking through the nature of the deal" and ensuring that both parties' goals are satisfied.

Rewarding Innovation Will Drive Cultural Change

A likely consequence may be some failures; these must be accepted if innovation is to succeed. Innovators should be rewarded, *even if they fail*. Rewarding innovation continually incentivizes the progress that innovation can bring. This support to the workforce is needed and required to overcome the natural fear of failure and the consequent reluctance to be innovative. The workforce should be convinced that no punishment will be meted out for carefully considered risk-taking. In fact, it should be demonstrated that the "no-penalty, safe-business-as-usual approach" is fast becoming outdated.

Incentives can be provided as a reward for innovation. A number of different ways now exist to reward those innovators within the government who dare to take risks. As a minimum, these include incentives such as office gain sharing, individual gain sharing, and highlighting contributions in lessons-learned activities. It will take leadership at all levels, and possibly regulatory change, to expand the avenues for rewarding innovation (including monetarily) in new and effective ways.

Improved communication, improved training, and improved leadership are essential to "reinvesting" the lessons learned within schoolhouses and throughout the workforce. The transfer of knowledge and experience to all levels offers an exceptional opportunity to provide a continuum of innovation that can build upon itself. This can only happen if innovation and creativity are encouraged, recognized, and rewarded at all levels of the acquisition and contracting community.

The *Factor Collaboration*[SM] Process

Business relationships must be structured in a way that maximizes the chance of a successful win-win partnership. Not only must the relationship deliver what is required to the government customer, but also it must appropriately balance risk between the government and the contractor. In addition, it must appropriately reward the contractor for assuming the performance risks. Contracts must not be structured to offer incentives for contractors to behave in ways counterproductive to the purpose of the contract.

Traditionally, the government team developed and implemented an acquisition strategy for a competitive or sole-source procurement that may or may not have included meaningful industry involvement. If it did not, consequently the team lacked real insight to the business case and the industry issues.

As acquisition reform gained effectiveness, earlier teaming of all parties interested in the success of procurement, including the contracting community, became a more common occurrence. Today, it stands as a hallmark of a successful procurement.

But early involvement alone is not sufficient for success. Rather, the process of early involvement creates a cooperative atmosphere that greatly influences the probability for success. A successful business relationship must include a clear understanding of the goals of the procurement and the motivations of all interested parties associated with the procurement.

Factor Collaboration[SM] Defined

As stated previously, *Factor Collaboration*[SM] is the joint assessment of influences and factors that impact the structure of a potential business relationship. It promotes and supports a "meeting of the minds" with respect to the procurement and its business case and "forces to the surface" critical information necessary for the construction of that successful business relationship in these important areas:

- Requirements
- Influences and Factors

- Motivation
- Most Effective Incentive

For the government, the factors are key decision points used in crafting the acquisition and contract strategy for the procurement. For the contractor, they go initially to the "bid decision" followed by price, performance commitments, and other terms and conditions they are willing to propose in entering into a business relationship with the government.

Unique knowledge may drive a differing assessment of a given factor. Surfacing and discussing these differences provides an opportunity to improve the understanding of the business case and to provide the insight necessary for understanding each other's motivation. This understanding can lead logically to considering which contractual incentives are needed by industry and can be offered by government to meet the goals and objectives of both parties.

Business Case Factors

The factors reflect a baseline for further development and constitute major considerations within the business case.

Requirement

What is needed and being purchased – systems, spares, base support, services, construction, commercial items, or information technology – and how it is specified or described.

Acquisition Phase

The major phase of the acquisition cycle – R&D, production, or sustainment.

Primary Performance Risk Parameters

Three main performance parameters targeted by contractual incentives: technical performance, cost, and schedule.

Size

Relative assessment as a "large" or "small" procurement. For industry, relativity is a function of internal or corporate definitions of size. For the government, it is defined by the Federal Acquisition Regulation (FAR).

Contract Type

While vehicles such as "other transactions" may be considered, the two major types of contract vehicles of interest here are *fixed price* or *cost reimbursement.*

Program Stability

This factor refers to a program's susceptibility to disruptions in funding, schedule, requirements, and political and other support. While the government and the contractor will view basic program stability more or less in the same light, the contractor may also view stability in additional ways, including:

- Ability to project forward with certainty.
- Stability to develop an efficient supply chain.
- Ability to recover front-loaded costs.

> Factor Collaboration℠ is the joint assessment of influences and factors that impact the structure of a potential business relationship.

Program/Contract Flexibility

This factor refers to the flexibility of the program and adaptable contract vehicles. This can be viewed in a variety of ways, such as:

- Ability of the contract structure to allow for terms and conditions to evolve with the program.
- Process for how this contract will/can evolve as a result of changes. (An example of this is the opportunity or ability to negotiate a strategic alliance or overarching partnership agreement that includes problem-solving rules. The program is viewed as a whole rather than as specific projects and contracts.)
- Mechanism for the contract change process.

Competitive Environment

The government, within the laws that require competition or a justification for its absence, evaluates the opportunities to compete the procurement and the effectiveness of competition in successfully fulfilling requirements. Examples include:

- Competition in general.
- Ability to structure incentives to maintain contractor efficiency throughout the period of performance.
- Assessing the option of introducing competition when a contractor is performing poorly.
- Incentivizing participation in circumstances where there is limited or no competition.

The contractor evaluates the chances of competing and winning. Issues can include the following:

- The chance of recovering the "costs of competition" and in some instances, the "nonrecurring costs of market entry."
- Opportunities for successive, related, or follow-on contracts.

Entry Barriers

The government evaluates the marketplace for the goods or required services, and assesses the conditions that might adversely affect the opportunities for contractors to successfully compete. With respect to incentives, the degree of incentivization applied may directly affect the number and type of offerors that consider the procurement opportunity.

The contractors assess the obstacles or challenges they face to become "players" in the procurement. The perceived importance and value of the incentives will determine participation. Examples include:

- Period of performance considerations – time to recoup investment in front-loaded costs.
- Relative competitive advantage with respect to costs of performance.
- Incentive considerations – sufficient incentive opportunity to be earned to justify an investment by the contractor.

Performance History

The government considers the past performance of the contractor(s) as an indicator of future performance. The contractor, in considering this factor, is interested not only in how this assessment will affect its win probability, but also how they are viewed within the industry or marketplace – their competition.

Future Effort

The opportunity for future contracts for follow-on work, related work to other programs, spares, and other support.

Corporate Strategy

While the government is concerned with a contractor's approach to the procurement, this area primarily involves the contractor. Areas of importance include the following:

- Impact of the procurement to return on investment (ROI).
- Impact to cash-flow timing.
- Impact on market share.
- Access or opportunity for access/improvement in technology.
- Timing considerations, such as "first to market" advantages.
- Supply chain considerations, including maintaining good relationships with suppliers and processes that lend themselves to an advantage for other contracts.

Inherent Risk

The government views this factor as an assessment of contractor capability to handle or mitigate the commonly understood areas of risk (cost, schedule, and performance) during the performance of the contract. There are two components: the probability of failure to achieve the desired goals and the consequences of that failure.

The contractor also views this factor within the context of business and market risk. This includes the opportunity costs of investment in this effort, compared to other investments and the costs associated with failure in the marketplace. Business risk also includes such areas as the potential for changes in business base, rates, and inflation during the terms of the contract.

Industry Dynamic

This factor addresses the maturity of the industry area that would be covered by the procurement. The government focus can include assessing the opportunity for participation and the necessity and structure of incentives to attract interest.

The contractor is interested in the opportunity for growth within its industry: Is it increasing (i.e., in a new and innovative technology area)? Has it leveled off? Or are opportunities declining?

The Concept

Through the disclosure and sharing of information essential to the planning and execution of a successful business relationship, *Factor Collaboration*[SM] can increase the likelihood that contractors will deliver successful results to government customers. It can effectively support both sole source and competitive procurements. The concept for its use is briefly reviewed in the discussion that follows.

Sole Source

As early as possible, both the government and the contractor review the factors they believe are relevant to the procurement. The government will generally have greater initial insight into the factors relevant to the requirement and procurement strategy, while the contractor will generally have greater initial insight into factors relevant to their internal decision making.

The government and the contractor must openly and honestly assess all of the factors because their unique perspectives define the most effective contractual incentives for the instant acquisition. In some cases, perspectives will overlap, while in other cases, perspectives will diverge given the factor considered and the level of insight and information available to each party.

Exploring these "differences in perspective" should surface critical information necessary for a more complete understanding of the business case. This process will help the parties collaboratively define an incentive approach that:

- Recognizes the needs and motivations of the parties at that particular point in time and through the period of performance.
- Reflects a contract strategy that the government believes will ensure delivery of the requirement successfully and at "greatest value."

Note that Concept Exploration is not included in this discussion.

Competitive

Factor Collaboration[SM] can also be useful within a competitive environment. Although certain information may not be available initially as in the sole source environment, given the recent changes to FAR Part 15 on communication between the government and the offerors, it may now be easier to conduct the analysis discussed earlier without affecting the integrity of the source selection process. Exchanges with potential offerors, prior to release of the request for proposal (RFP) and receipt of proposal, would be similar to the current process involving early involvement, such as industry forums, draft RFP exchanges, and so on. There needs to be latitude in Section L and Section M of the RFP for offerors to propose different or innovative incentives.

The "greatest value" concept is based on a broader perspective than best value. While "best value" takes into account a standard to meet (i.e., good, better, best), "greatest value" may recognize that the selection may not in fact be the best of all alternatives. It may, however, be good enough, and by paying less for the service or support, still meet the requirement at lower cost and risk.

After receipt of proposals, discussions based on the individual contractor's approach and perspective on the factors could include tailoring contractual incentives appropriate for that offeror and its potential relationship with the government. One example might be the prospective tailoring of incentives to improve performance of the potential offeror in an area identified as weak, but necessary for the success of the delivery, through evaluation of past contractor performance.

Individual contract arrangements might differ among contractors. The integrity of the source selection process, however, must be maintained. Discussions may not impart a unique advantage or provide insight to another's proposal or approach. The goal is to enable the offeror to provide the best possible proposal and for the government to improve the probability of the successful delivery of the requirement.

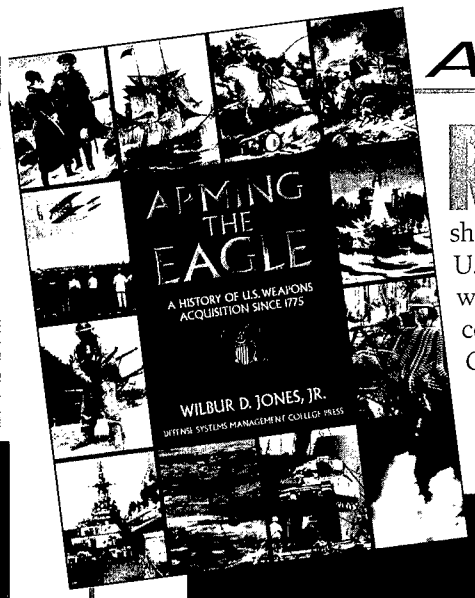
As part of the award, the terms and conditions of the successful offeror's contract could address tailoring the incentives through an "incentive adjustment plan" laid out in the successful offeror's proposal. During the subsequent period of performance, this post-award tailoring could address improvements to the incentives that were applied, based upon changes in the factors affecting the business relationship.

In summary, *Factor Collaboration*[SM], as part of a comprehensive examination and understanding of the business case, can facilitate the gathering of critical information necessary to the construction of a successful business relationship.

Editor's Note: The author welcomes questions and comments about this article. Contact him at **WILLIAM.S. KAPLAN@saic.com.**

DSMC Publishes Long-Awaited History of U.S. Weapons Acquisition

ARMING THE EAGLE



Retired DSMC professor Wilbur D. Jones Jr., signs copies of his book, *Arming the Eagle: A History of U.S. Weapons Acquisition Since 1775*, during a recent visit to Scott Hall, DSMC main campus, Fort Belvoir, Va. *Arming the Eagle* is a series of essays, or snapshots, of various periods in the country's military history. The essays tell the story of how U.S. weapons were developed and produced, what notable managers and organizations were involved, and which weapons from those periods significantly impacted national conflicts. The book may be ordered from DSMC and the Government Printing Office. Call DSN 655-2151 or (703) 805-2151 for price and ordering information.

Pictured from left: DSMC contract employee Kevin Parr; Jones; Army Sgt. 1st Class Frances Battle.

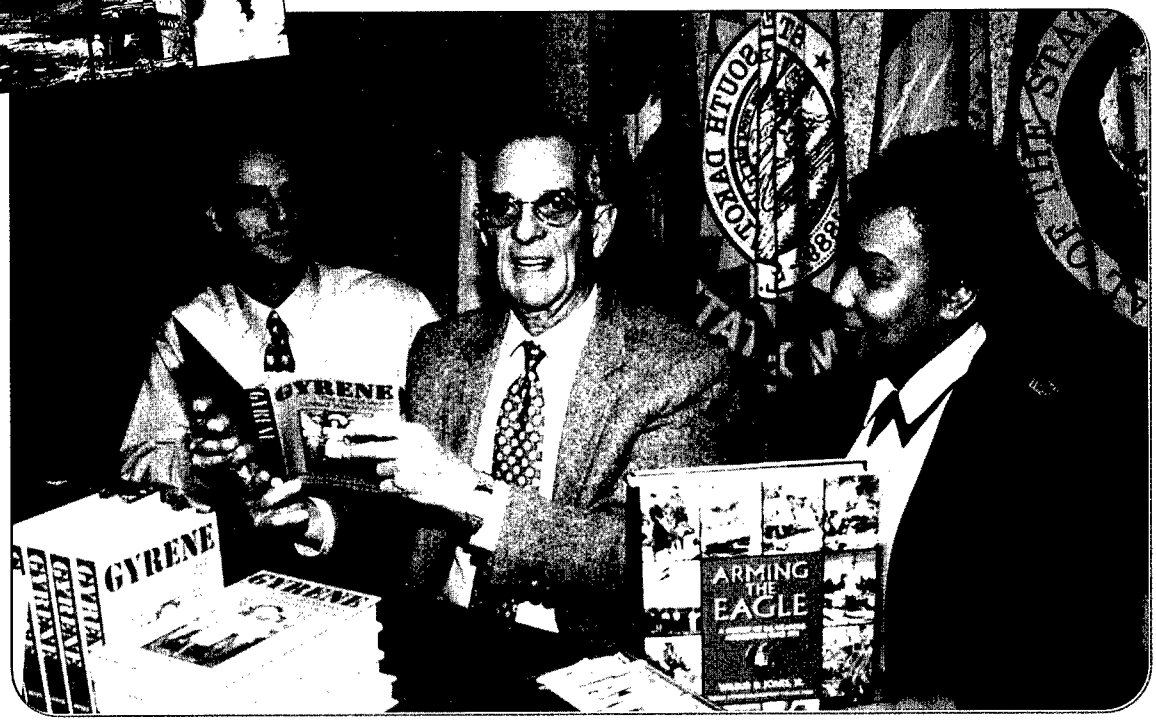


Photo by Richard Mattox

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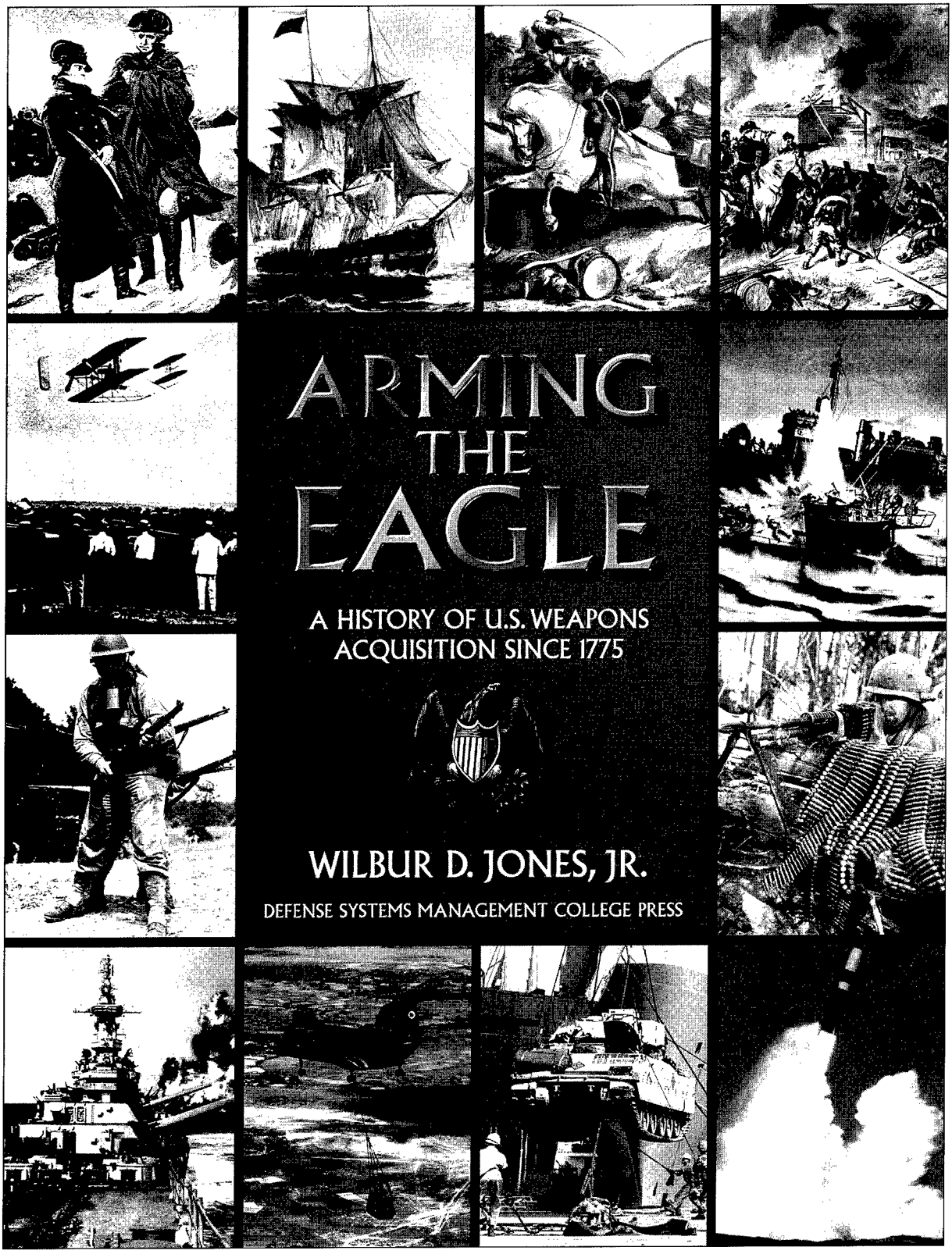

HE EAGLE

LL FIND INSIDE...

PROMOTION RATE FOR OFFICERS IN AN ACQUISITION CORPS

GANSLER SENDS FINAL REPORT TO CONGRESS

In response to subsection 849 (b) of Public Law (Pub. L.) 105-85, "National Defense Authorization Act for Fiscal Year 1998," Dr. Jacques S. Gansler, Under Secretary of Defense for Acquisition, Technology and Logistics, provided to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives the last of three reports assessing the extent to which each military department is complying with the requirement set forth in subsection 1731(b) of title 10, United States Code.

Subsection 1731(b) requires the Secretary of Defense to ensure that the qualifications of officers selected for an Acquisition Corps (AC) be such that the AC officers may be expected to achieve promotion parity with those not in the Acquisition Corps. The intent is to ensure that the Services select high quality officers to perform acquisition duties.

Gansler's Jan. 28, 2000, report assesses the success of the Department of Defense in meeting that requirement. Specifically, it provides a discussion of the promotion rates of AC officers for the grades of lieutenant colonel/commander (O-5) through major general/rear admiral (O-8) in comparison to their nonacquisition counterparts for each military department for fiscal years (FY) 1999 and prior. Noting improvements and concerns, Gansler's report stated:

> **"I reported last year that the statutory promotion expectations for military acquisition professionals were not being realized equally well at all levels by all Services. The Services' initiatives have resulted in significant improvements in FY 1999 with the best overall promotion results for the acquisition corps since the selection criteria became effective in FY 1994. For FY 1999, the AC officers achieved broadly comparable promotion rates, supporting the Services' assessment that quality officers are being selected for the AC. My one concern is lower Army AC promotion rates to O-5 and O-6 due to an excess of candidates. I am confident the Army will correct this temporary shortfall. We will continue to monitor the promotion rates as one of our key measures for ensuring that the Services continue to select high-quality officers to perform acquisition duties."**

Editor's Note: To read the entire report, go to **http://www.acq.osd.mil/ar/#sat1** on the Deputy Under Secretary of Defense (Acquisition Reform) Web site.

DSMC 2000 Catalog **Now Online!**

The *DSMC 2000 Catalog* is now online at **http://www.dsmc.dsm.mil/courses/cat_sch.htm.** This year's catalog provides information on the college and its divisions; alumni association; regional centers; application procedures; course descriptions; key phone index; faculty and staff information; and other general information.

Printed copies of the Catalog are also available for mailing. If you desire to receive a printed copy of the catalog or have your name added to our mailing list, please E-mail Mona Lemelin at **Lemelin_Mona@dsmc.dsm.mil.**

2000 Army Roadshow Schedule Acquisition Workforce 2000 Briefings

Location	Command	Dates
Atlanta, Ga.	FORSCOM	TBD
Orlando	STRICOM	TBD
Huntsville, Ala.	AMCOM/SMDC	May 9-12
Texas (Fort Worth)		May 22-23
Fort Hood, Texas		May 24-25
Warren, Mich.	TACOM	May 30-June 1
Europe	USAREUR	June 11-17
Germany		June 12-14
England		June 15-16
Fort Monmouth, N.J.	CECOM	June 26-27
Picatinny Arsenal, N.J.	ARDEC	June 28-29
Forts Monroe, Lee & Eustis, Va.	TRADOC	July 11-12
Omaha, Neb.	COE	July 26-27
Fort Huachuca, Ariz./White Sands Missile Range		Aug. 15-18
Fort Detrick, Md.	MEDCOM	Sept. 6-7
Yuma, Ariz.		Oct. 11-12
San Antonio, Texas	MEDCOM	Oct. 23-24
Rock Island, Ill.	IOC	Nov. 13-14

THE DEFENSE ACQUISITION UNIVERSITY

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The Defense Acquisition University (DAU) invites you to attend the **"DAU Beyond 2000: Excelling @ the Speed of Change"** conference to be held at the University of Maryland Conference Center, College Park, Md., Nov. 14-17, 2000.

Proposed sessions may include the following topics/tracks:

- Educational Technologies
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- Assessment
- Evaluation
- Professional Development
- Technical subject matter in all defense acquisition subject areas such as contracting, engineering, logistics, production, and quality management.

This conference is designed for faculty and staff to explore such dimensions as learning technology, the emergence of education methodologies, and professional development. It will offer attendees an opportunity to hone educational skills, develop new skills, and investigate new educational opportunities. Please join us in this challenge.

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"Electronic Business in Action" was the theme for EC Day 1999, which highlighted the use of commercial EC technologies to improve the way DoD supports the Warfighter, Industry Trading Partners, and the Business Functions. EC Day 2000 continues this initiative and sets a milestone in electronic business process development for the new century.

EC Day 2000 is a sanctioned activity, conducted in support of OSD's Acquisition and Logistics Reform Week (May 22-26, 2000). This year's notable lineup of speakers and panels promises to make EC Day 2000 a positive influence in DoD's planning for and implementation of electronic commerce throughout the millennium. Also expect an interesting and comprehensive array of government and commercial EC exhibits to complement the day's activities.

For more information on EC Day 2000, call the EC Answer Line at 1-800-334-3414 or go to the JECPO Web site at **http://www.ecday2000.net/** on the World Wide Web.

SPECTOR RECEIVES DISTINGUISHED CIVILIAN SERVICE AWARD

Eleanor Spector, former Director of Defense Procurement, receives the Department of Defense Distinguished Civilian Service Award March 9 in a ceremony held at the Crystal Gateway Mariott, Crystal City, Va. Presenting the award is Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition, Technology and Logistics). Spector retired from federal civilian service in February. Deidre A. Lee, the current Administrator of the Office of Federal Procurement Policy (OFPP), has been selected to become the new Director of Defense Procurement.

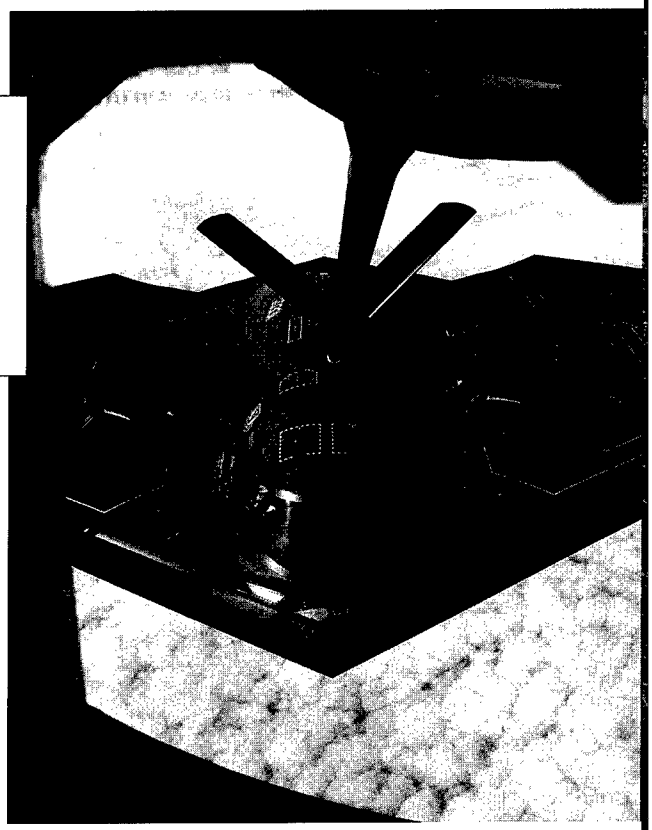
Photo by Richard Mattox

Last B2 Buy Used Process Built on Trust

"The Paradigm Process"

TONY D. WHITE • TWYLA F. KESLER

Negotiating a $453-million rework and conversion effort for an airplane slated to go to the Air Force Museum into a fully operational weapon system, admittedly is no small effort. And to do so in *less than 180 days* is indeed uncommon. Nevertheless, on Oct. 26, 1996, the Air Force completed negotiations for the rework and conversion of the B-2 Air Vehicle One (AV-1). This article tells the story of how a small core of people from the B-2 Systems Program Office (SPO) at Wright-Patterson Air Force Base in Dayton, Ohio, and the prime contractor, Northrop-Grumman, negotiated that effort in less than 180 days using "The Paradigm Process."



A B-2 Spirit prepares to receive fuel from a KC-135 during a mission in the European Theater supporting NATO Operation Allied Force.
U.S. Air Force photo by Staff Sgt. Ken Bergmann

Admittedly, the process is not unique, but the successful and timely completion of this sizable negotiation by the B-2 SPO merits detailed documentation for those readers who may be involved in similar efforts. In addition to a detailed explanation of the process, the article also includes an experience-based suggestion and recommendation (at the end of each section) for improving the process still further.

Friends Share Information

Integrated Product Teams (IPT), IPT Pricing, Teaming on Proposals, "One Pass" – all are just a few of the names used to describe what the B-2 SPO calls the Paradigm Process.

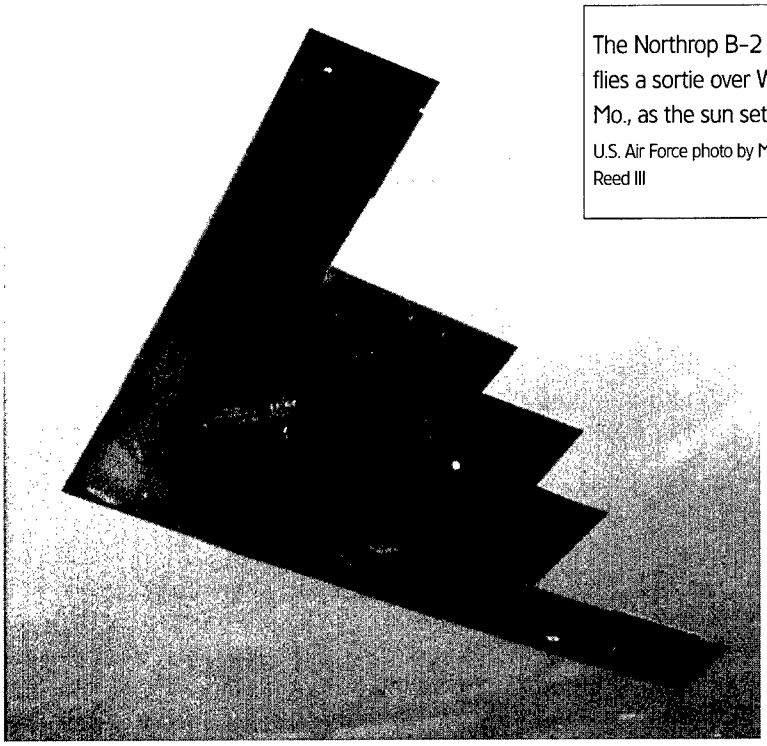
Typically, friends share information, while enemies hide or distort information to gain an advantage. In essence, the Paradigm Process is a methodology that compensates for this very human of tendencies, and promotes working *with* the contractor as a *team* vs. the old adversarial way of doing business. The AV-1 SPO used the Paradigm Process to build trust between the contractor and the government personnel who comprised the AV-1 team. Above all else, trust allowed a small group of people, the AV-1 SPO, to complete a sizable procurement, worth nearly one-half billion dollars, in less than 180 days.

Forming a Core Team

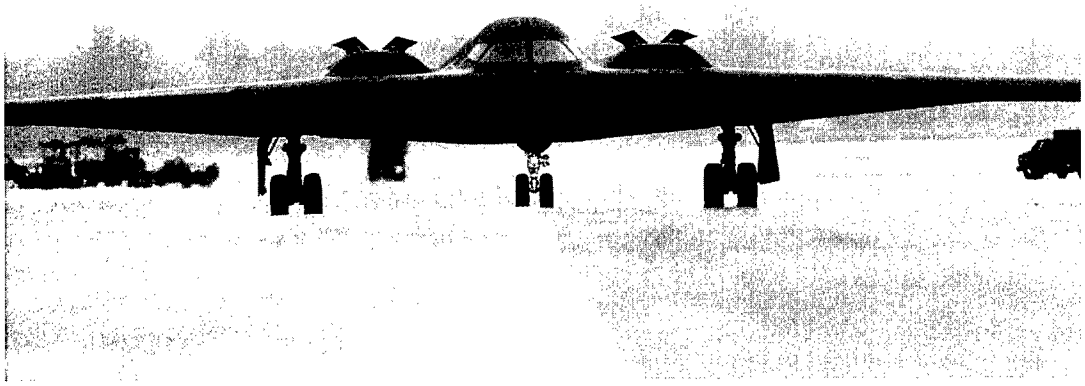
Beginning their efforts to bring the 180-day procurement from concept to reality, the B-2 SPO and Northrop-Grumman upper management chose team members from their respective organizations. Christened the AV-1 team to instill team identity in lieu of employer identity, their mission was clear: **Do it right the first time and find a way to make it work as you go along**. Energized with the desire to succeed and working under severe time constraints, team members set about their assigned tasks, gleaning insights from previous programs that had implemented a similar method. While this was a good beginning, how could it be improved?

A key enabler of the paradigm process is to work together early. By early, this means before the government and contractor become so locked in their re-

White *is currently an instructor at the Air Force Institute of Technology teaching Intermediate Pricing; and a member of the National Contract Management Association, Dayton Chapter. From 1982 to 1997, White was a Price/Cost Analyst Negotiator for the Air Force and was one of the main pricers for the B-2 program. He also has experience pricing F-15s, F-16s, B-1s, Trainers, and miscellaneous other procurements. White holds a B.A. in Business from New York State University and a M.S. in Contracting from the Air Force Institute of Technology.* ***Kesler*** *is currently a program manager in the Business Area Operations Division, Headquarters, Air Force Materiel Command. She has served as a Logistics Management Specialist in the Special Operations Forces Special Program Office (SPO), C-17 SPO, Propulsion Systems SPO, and as a program manager in the F-16 SPO. Kesler holds a B.S. in Business Management from Wright State University and an M.S.A. in Business from Central Michigan University.*



The Northrop B-2 Spirit bomber flies a sortie over Whiteman AFB, Mo., as the sun sets for the day.
U.S. Air Force photo by Master Sgt. Keith Reed III



A B-2 "Spirit" Stealth Bomber of the 509th Bomb Wing, Whiteman AFB, Mo., prepares for take-off during exercise Global Guardian.
U.S. Air Force photo by Tech. Sgt. Lance Cheung

spective positions that each refuses to compromise. Be *proactive*, not *reactive*.

Pre-Kickoff Meeting

For the B2 procurement effort, a pre-kickoff meeting may have proven instrumental. At this meeting, a core group of both government and contractor team members would be formed. Ideally, this core group should be no more than 10 people, with half the membership from the Government and half from the contractor. A pre-kickoff meeting should be scheduled so that everyone on the core team understands and buys into the Paradigm Process. Moreover, this core group must champion the process to the rest of the AV-1 team and must also have the verbal and written backing of their respective upper management. Without that backing, the Paradigm Process is destined to fail.

Communication Process

Additionally, the core group must establish a communication process at the pre-kickoff meeting and use the process chosen regularly throughout the procurement. Had this been done, it would have enabled the AV-1 team to generate quick responses to potential problems before they became "show stoppers." Although the team did implement a chain of communication throughout the procurement, it proved inadequate and sporadic. Admittedly poor early on, communication improved over time. Normally, the team communicated via weekly video teleconferences, E-mail, written correspondence, and daily phone calls.

Direct Communication

It should be noted that communication was not limited to core group members only. All AV-1 team members participated. Members were empowered to reach agreement directly with their functional counterparts; for instance, contracts to contracts, logistics to logistics, etc., as opposed to multiple layers of approval normally associated with such communication. However, this did not eliminate the need for a single Person of Primary Responsibility to avoid duplication of work and wasting precious time.

Quick and frequent communication enabled team members, using the Paradigm Process, to complete the procurement within the prescribed time period. Direct functional communication was the key.

Kickoff Meeting

The next step should be to initiate every member of the procurement team, explaining the following items in detail:

- What they will be doing?
- How they will accomplish the task?
- Who will be responsible?

- What is the purpose of the schedule of events?
- Most importantly, exactly how does the Paradigm Process work?

The AV-1 team did not have an all-inclusive kickoff meeting, but instead, a series of small meetings with the three largest subcontractors – Hughes, Boeing, and the Northrop-Grumman Commercial Aircraft Division. The kickoff meeting, which was also the preliminary fact-finding meeting, not only served to instill the Paradigm Process, but also introduced the AV-1 team to the novel overall strategy that put the subcontractors' proposal preparation after the AV-1 team evaluation of their specific task sheets. Evaluations were to be completed before the three subcontractors' proposals were presented to the prime contractor.

AV-1 team members were told at the various mini kickoff meetings that they would work closely with each other to put together a proposal that reflected both the contractor's and the B-2 SPO's position. This was to be done, to the maximum extent possible, in both hours and material. Differences in the two positions would be the exception rather than the rule. The attendees at those meetings did not readily embrace the Paradigm Process. Change is always met with resistance. To reiterate – *Change is always met with resistance.*

The first in the series of small kickoff meetings explained the Paradigm Process to the attendees in detail. At the time, the prime contractor, Northrop-Grumman, bought into the process. In subsequent kickoffs, however, not all of the major subcontractors nor Northrop-Grumman's sister divisions accepted the challenge.

A useful tool at the outset of the Paradigm Process would be a videotaping of the first kickoff meeting. Had the B-2 SPO videotaped the first meeting, they could have used it to bring the numerous remaining subcontractor and Government personnel up-to-speed quickly and uniformly. Moreover, such a video, along with two AV-1 team members present to answer questions (one representing the government, the other the prime contractor) could have been presented to the "Top 10" subcontractors (in rank order of dollar value). This would have sent the message, "The Paradigm Process will be used! Come on board!" This showing of solidarity would have encouraged subcontractors to also use the Process, which ultimately may have eliminated or at least minimized problems that surfaced during this procurement. A look at those problems, as well as successes, follows.

Beware of "Show Stoppers"

Although not the largest subcontractor, Hughes presented the largest challenge. Seemingly ignoring the Paradigm Process, Hughes conducted the procurement in their normal fashion; for them it was business as usual. Allowing neither Northrop nor the SPO to review their task sheets before they completed their proposal, they were also very apprehensive about giving information to the Defense Contract Audit Agency (DCAA) auditor. That fact slowed the AV-1 team's analysis of their effort.

As a result, negotiations with Hughes were prolonged with many false starts and slow-rolling techniques implemented by both sides. All these problems impacted the completion schedule. Communication was also a problem. Contention over hours-per-task in the Hughes evaluation caused a minor breakdown. Unable to reach an agreement, Northrop-Grumman and Hughes jointly decided to table the matter until negotiations. This decision was in direct opposition to the philosophy of the Paradigm Process, which is to settle differences as soon as possible –work it early while the problem is still small.

To free the logjam, select members of the AV-1 core team traveled to Hughes, and eventually reached an agreement. If communication with Hughes had been better, core team intervention would not have been necessary. Hughes would have been a small problem and not a potential show stopper.

Buying In

Boeing was not initially part of the Paradigm Process, but once the Boeing AV-1 team members explained the process to Boeing's upper management during the task assessment phase, the company bought into it wholeheartedly. Overall, Boeing did an excellent job of working together with the prime contractor, SPO, DCAA, and the Defense Contract Management Command (DCMC). They allowed joint fact-finding on task assessment sheets with everyone present – a decision that contributed greatly to the timely completion of the procurement. The AV-1 team spent many weeks at the Boeing plant in Seattle, Wash., evaluating the Boeing task sheets. This teaming worked so well that the prime contractor used the DCAA position for material and rates; and DCMC used Northrop-Grumman's evaluation, with only a cover page explaining the few differences between the two evaluations. A breakdown did occur with Boeing, however, later in the acquisition.

Boeing and DCMC were also negotiating rates and factors in this same time frame. A message came to the SPO that both sides had walked away from the table. These rate negotiations had to be completed before the AV-1 negotiation could complete theirs. In an effort to help the AV-1 team complete their negotiations in a timely manner, the SPO took on the job of facilitating the DCMC-Boeing rate negotiations. Calling the highest government representative resident in Seattle, the Corporate Acquisition Contracting Officer (CACO), the SPO asked him to look into the program. With his help, the rates and factor negotiations were quickly put back on track. This was one more obstacle eliminated because the AV-1 team worked so closely together.

DCAA and DCMC also were present at all the kickoff meetings although not in the numbers that were needed. DCAA's job was to evaluate material at the prime contractor and all the subcontractors, as well as provide rates and factors. DCAA also took on the task of compiling all the subcontractor and prime contractor audits into a single coherent report. DCMC's tasks were to, whether on their own or with the help of the SPO, evaluate hours at the prime contractor as well

as the subcontractors. Because they are a large organization with many experienced people, DCMC was in a position to do this. Further, they are located at the appropriate prime contractor and subcontractors' facilities.

"Traffic Light" Methodology

The AV-1 team initiated a methodology that quickly solved potential problems and allowed the team to concentrate their efforts where they were needed. Essentially, the methodology worked just like a traffic light. After the team discussed and evaluated all the estimated hours for each task sheet, task sheets were then rated red, yellow, or green. **Red** meant that the SPO exceptions were greater than 10 percent of the contractor's estimate. **Yellow** meant the exceptions were from 5 percent to 10 percent. **Green** meant the exceptions were 5 percent or less.

Once the differences became less than 5 percent, or green, discussions stopped and the team moved on to the remaining differences. This method helped size the problems and eliminate them early. Although, not all task sheets became green, most did.

This methodology resulted in only one task sheet reflecting a difference of more than 10 percent, or red, by the start of negotiations. In this case, the prime contractor and the SPO simply agreed to disagree. And although the two parties discussed the difference during the negotiation phase, visibility was quickly lost because of the type of contract. In the end, the SPO negotiated only the bottom line; the contract was a firm fixed price.

The Proposal

The prime contractor's team worked very hard to put together a good proposal and in record time. They put in many late nights, long hours, and weekends to make it happen. Without their Herculean efforts, the usually lengthy proposal process would have stopped the timely completion of the procurement.

Government personnel did anything they could, making calls from the SPO to appropriate DCAA and DCMC field offices to help overcome adverse opinions in audits, to help explain any exceptions, and to let all government personnel know that this procurement was being worked as a team – it was not to become a forum for voicing old problems. If the problems specifically affected the B-2 procurement, the AV-1 team worked them. If not, these problems were put on a shelf to be worked at a later time. The AV-1 procurement would not be held hostage to problems that were not germane to the AV-1 negotiation. The primary motivating factor must be completion of the current contractual action.

One set of the problems that always surfaces with a proposal is additions, deletions, and changes. These happen because all things change over time. This proposal was no exception. As they worked the procurement, the AV-1 team made additions based on new information and many changes to subcontractor's bids, which were generated by the short time given the subcontractors by the prime contractor to prepare the proposals.

The team gave the prime contractor 90 days to prepare the proposal; but the prime contractor, in turn, had to give the subcontractors time to prepare their proposals. The subcontractors also had third- and fourth-tier subcontractors to contend with. If the fourth tier was given 30 days, and the third tier 30 days, the second tier 30 days, and the prime contractor 90 days, then that would have equated to 180 days. As a result, the AV-1 team would have been late completing the negotiation.

To expedite the proposal process, the team published contractor guidance, urging potential subcontractors to prepare proposals based on the most current information available but not to hold up the proposal process because a third- or fourth-tier subcontractor failed to respond in a timely manner. Instead, the AV-1 team used telephone quotes or earlier quotes and increased them based on inflation. These quotes were updated as more current information became available.

The prime contractor prepared their proposal but kept the AV-1 team current by promptly communicating changes that occurred such as subcontractor negotiations they completed, and any other fact germane to the negotiation.

The Government Objective

Once the contractor presented the proposal to the government, the tide shifted. It was now up to the government to set their objective based on the proposal, SPO technical analysis, DCAA audits, subcontractor evaluations/audits, and their own logic. The entire government team did the work. The AV-1 SPO portion of the team worked together to develop the terms and conditions, warranty, swing clause, and price analysis. The team's effort solidified the objective and helped negotiations go smoothly. Negotiations were made somewhat simpler because Northrop-Grumman rates and factors at the prime were negotiated right before the government completed their objective. This removed rates and factors as a problem.

In addition, the "traffic light" methodology used to create the hours really paid off. The government objective reflected less than a 2-percent difference from the contractor's position. The entire government team worked on the Business Clearance Document. Members wrote on their areas of expertise so that the AV-1 schedule would not slip. There were no heroes, no lone rangers – just a team working together to achieve its goal.

The objective flowed smoothly through business clearance at all levels because the entire team was very knowledgeable about the objective, not just the Procuring Contracting Officer and price analyst. No surprises were forthcoming, and even though problems surfaced with some of the subcontractors, enough information became available to formulate a reasonable position. No one subcontractor or one issue became a show stopper.

At this point in the Paradigm Process, two obstacles emerged, both stipulations dictated to the AV-1 team by upper management on the government side. The first was that the proposal of the main

subcontractor, Boeing, must first be negotiated before the AV-1 team completed final negotiations. The second was a limit on the percentage of profit. These two stipulations were outside the direct control of the AV-1 team and either, alone, could have stopped timely completion of the procurement. They did not. When all was said and done, the team completed the Boeing negotiations, and the profit limitation was not breached.

No Games, No Tricks

The AV-1 team completed negotiations in three days, with the government's offer considered a FABIO (First and Best Initial Offer). Capitalizing on all the work the AV-1 team had done, the government's offer was intended to reach quick, fair, and equitable negotiated settlement. There would be no games, no tricks, and the government would in no way destroy the AV-1 team's trust and camaraderie – an environment created through the hard work and mutual efforts of the entire AV-1 team. The negotiations were to end the procurement the same way it started – as a team. And the AV-1 team's purpose remained the same: to work together with the mutual goal of successfully completing the AV-1 negotiation on schedule and within the budget dictated by Congress.

One of the problems with the procurement was no-bids as a result of parts obsolescence. Subcontractors may not be building a part anymore because the company went out of business, the part may be based on old technology, or building parts in quantities of only one or two is no longer a profitable venture. The AV-1 found alternative sources for parts to overcome this obstacle.

Another problem was a decision to use spare parts, originally earmarked for the existing fleet, to lower the cost of the procurement. The depots' upper management originally opposed the decision. A study completed by the AV-1 team changed their position. This study, based on probabilities and estimates, projected the likelihood that a specific part would be used. Then, it was determined how many were available for immediate use. Essentially, we were able to procure installs from the spare inventories at the depots. Money was given to the depots to make or buy some replacements.

As we alluded to earlier in this article, the last problem encountered was between the prime subcontractor, Boeing, and Northrop-Grumman. Rate negotiations between Boeing and DCMC came to a standstill. Northrop-Grumman, Boeing, and the SPO discussed and dissected the problem. Hourly telephone calls between team members and the two companies became commonplace. This entailed late nights for the SPO because of the time difference between the East and West Coasts and even a Saturday. After only two days, negotiations resumed. A forward pricing rate agreement issued for Boeing enabled Northrop-Grumman and Boeing to complete their negotiations. The following day, the AV-1 team completed negotiations. The AV-1 team members' unselfish dedication to the completion of the procurement was key to meeting and even surpassing the goals of this procurement.

A Way of Life

The Paradigm Process is not just a way to do procuring; it is a way of life. Working with people, building trust, making friends, keeping promises, accomplishing a joint goal is the way that individuals, groups, teams, corporations, and nations should treat each other.

Editor's Note: For questions or comments on this article, contact White at **Tony.White@afit.af.mil** and Kesler at **Twyla.Kesler@wpafb.af.mil**.

Bryant Student Azel Kodi Awarded DSMC Commendation

The Defense Systems Management College Commendation Award was presented to Azel Kodi in a ceremony at Bryant Adult Alternative School, Alexandria, Va., Feb. 11, 2000, as part of the DSMC-Bryant School Partnership in Education Program. Presenting the award was DSMC Deputy Dean, College Administration and Services Dave Scibetta.

Kodi was born in Sudan and lived in Egypt four years before immigrating to the United States in 1996 at the age of 17. Soon after arriving, she enrolled at Bryant Adult Alternative High School. A member of the National Honor Society, she maintains a 3.9 grade point average. She is also on the Student Leadership Committee. Azel plans to enroll in Northern Virginia Community College and pursue a career in engineering.

The DSMC Commendation Award is given to honor students who improve and maintain a 2.8 grade point average; exhibit community involvement through participation in school activities; volunteer for leadership opportunities; demonstrate good citizenship skills; exhibit upstanding behavior in school and community; attend classes regularly; and exhibit responsibility by assisting teachers and other students in classroom activities. The award is presented semiannually and reflects the ideals in DSMC's motto: *Ductus Doctrina Dominato*, or Leadership, Scholarship, Management.

Photo by Barbara Benker

Defense Pilot Will Pave Way for Department-Wide PKI Use

General Dynamics Awarded Contract

WILLIAM JACKSON

To see if a commercial certificate authority can meet its high-assurance requirements, the Defense Department has chosen General Dynamics Communications Systems to conduct a one-year public-key encryption pilot.

Within two years, the Department wants to establish a public-key infrastructure to serve users with transaction needs from low- to high-risk.

DoD agencies have begun fielding PKI-ready applications. But the Department must establish a plan for handling digital certificates, using public-private key pairs, to encrypt and sign electronic data. The pilot is part of DoD's PKI Roadmap 3.0, which was released in October and lists requirements for the Department-wide PKI.

The Office of the Assistant Secretary for Command, Control, Communications and Intelligence defined the requirements for the PKI program, which the National Security Agency (NSA) is running.

Within two years, the Department wants to establish a public-key infrastructure to serve users with transaction needs from low- to high-risk.

The General Dynamics pilot is the first test of a commercial Class 4 program. Class 4 service, for medium- and high-value unclassified data on secure or unsecured networks, requires placing a digital certificate on a hardware token – in DoD's case, a smart card.

Class 3 service, for medium-value data in low- to medium-risk environments, permits a software token. Class 5, for high-value information in high-risk environments, requires NSA-approved Type 1 cryptography. General Dynamics is the only vendor so far to receive NSA approval of its Type 1 hardware and software cryptography.

When developing the PKI road map, the Department found widespread use of PKI-enabled applications at classes 3, 4, and 5. Eight agencies with Class 4 needs have asked to take part in the pilot, which is limited to 1,000 users.

"The long-term goal is to provide a Class 4 certificate to everyone within DoD and, where appropriate, Class 5 certificates via the target DoD PKI starting in January 2002," the road map document states.

Although commercial PKI products and services are still immature, the authors of the road map said they expect vendor interoperability within four years.

DoD already has tested commercial Class 3 PKI and has established its own decentralized Class 4 program using the Fortezza card for encrypting Defense Message System E-mail.

CyberTrust, a GTE unit in Needham Heights, Mass., will provide the digital certificates for the pilot.

Datakey, Inc., of Minneapolis will supply the smart cards that hold the digital certificates and private keys.

"We are the systems integrator," said Sandra Wheeler, business development manager for General Dynamics Communications Systems, formerly a part of GTE Government Systems. She said General Dynamics would give help desk support and training to integrate PKI into applications such as secure E-mail.

DoD registrars will access GTE's central certificate authority online through a Secure Sockets Layer connection. A registrar must verify in person the identity of each user receiving a digital certificate. A copy of the certificate goes to the certificate authority. Another copy resides on the smart-card token, which generates a public-private key pair with the private key on the token and the public key held by the certificate authority.

Messages are encrypted with a recipient's public key and decrypted with that person's private key.

Messages are digitally signed with the signer's private key and verified with that person's public key.

General Dynamics could act as the registration authority, "but in this model, we see most agencies having their own local registration authority, since it is an in-person identification," Wheeler said.

***Jackson** is a writer for* Government Computer News. *Reprinted courtesy* Government Computer News. *© 2000 by Post Newsweek Business Information, Inc., a division of* The Washington Post Company. *All rights reserved.*

MOUT-ACTD — A Positive Training Experience

ATEC's Perspective for Program Managers

MAJ. BRYAN J. McVEIGH, U.S. ARMY
THOMAS D. ZEBERLEIN • MICHAEL C. RYAN

> "Victory is the main object of war. If this is long delayed, weapons are blunted and morale depressed. When troops attack cities, their strength will be exhausted."
>
> Sun Tzu (Fifth Century B.C.)

As Somali shoppers watch, U.S. Marines march into Mogadishu, Somalia's Bakara Market to begin a sweep of the market for arms and munitions as part of Operation Nutcracker. The crowded market is the hub of Mogadishu's small arms trade.
DoD photo by Navy PHCM Terry C. Mitchell

Throughout the world, urban centers are increasingly becoming likely sites for U.S. military operations, and they are likely to remain hotbeds well into the 21st century. The complexities of this environment, such as line-of-sight restrictions, inherent fortifications, limited intelligence, densely constructed areas, and the presence of noncombatants, constrain our current forces and technology. More worrisome is the fact that the Army and Marine Corps do not currently possess an overwhelming technological advantage in an urban environment, unlike most other hostile environments where, technologically, they maintain weapons and information superiority.

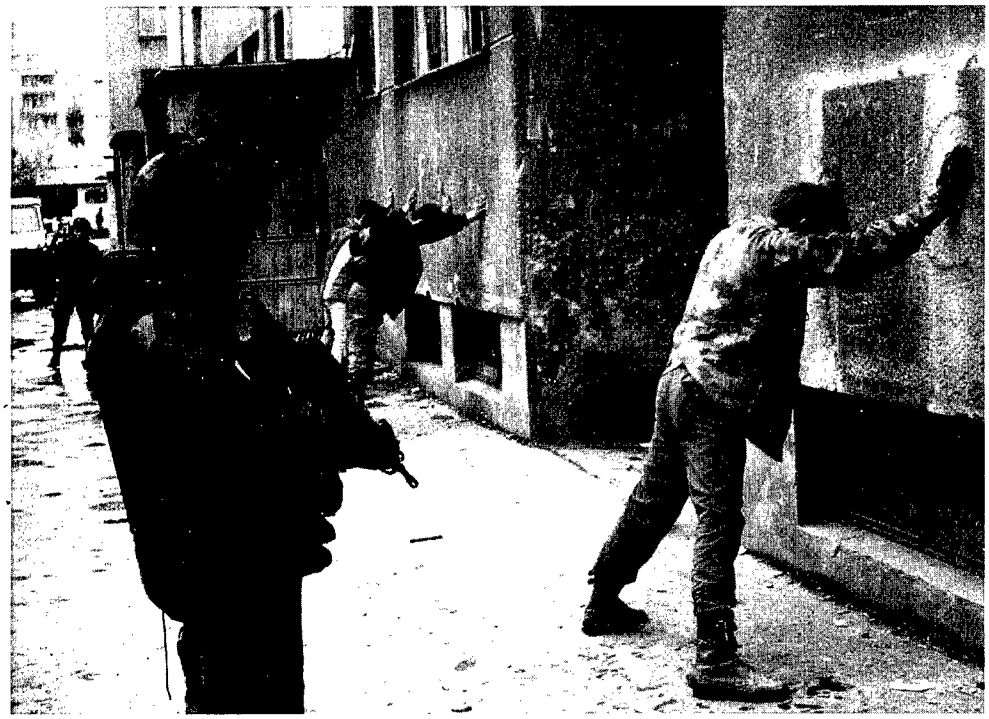
Bridging the gap between mission and capabilities is the Military Operations in Urban Terrain Advanced Concept Technology Demonstration (MOUT-ACTD), which has proven and is still proving its worth as a beneficial partnership among developers, users, testers, and evaluators.

The Army Test and Evaluation Command (ATEC) first became involved with the MOUT-ACTD in October 1998. Since then, Army and Marine Corps developers and users received and continue to receive the benefit of independent assessment by ATEC, while testers and evaluators gained and will continue to

McVeigh *is a graduate of the Naval Postgraduate School and is currently assigned to the Army Evaluation Center, Alexandria, Va., as the Lead Evaluator for the Military Operations in Urban Terrain Advanced Concept Technology Demonstration (MOUT-ACTD).* ***Zeberlein*** *was the lead analyst and co-evaluator for the MOUT-ACTD; and ATEC System Team (AST) Chair, lead analyst, and evaluator for the Rapid Terrain Visualization ACTD.* ***Ryan*** *has provided technical contract support to the Close Combat Evaluation Directorate, Army Evaluation Command for the last three years and has contributed to the writing of ATEC's assessment plans and reports for the MOUT-ACTD, the Rapid Force Projection Initiative (RFPI) ACTD, and the Division XXI AWE. He is a graduate of PMC 95-1, DSMC's former Program Management Course (now the Advanced Program Management Course).*

Marine from Charlie Company rushes to his objective during Exercise Urban Warrior at the Military Operations in Urban Terrain facility at Camp Lejeune, N.C.

DoD photo by Marine Lance Cpl. Scott A. Harwood



Italian soldiers guard three men suspected of setting fires in the town of Gorbavice, a suburb of Sarajevo, the day before it is to be handed over to Bosnian control.

DoD photo by Army Spc. Jean-Marc Schaible

gain data and insights to support future testing efforts. Equally important, the MOUT-ACTD demonstrated and continues to demonstrate how teamwork and cooperation between all the key players can strike a reasonable balance between the need to gather data and the need to provide warfighters with a positive training experience.

ATEC, which is formally known as Operational Test and Evaluation Command, became involved with the MOUT-ACTD in October 1998. In this article, we provide a general background, overview, assessment opportunities, ATEC's Assessment Methodology, and finally insights into the overall ACTD process from our perspective as lead analysts and evaluators. These insights include such issues as clearly defined requirements early on; advantages of multiple experiments; good idea cutoff date; transition to the acquisition process; and transition to the test and evaluation process.

Pressing Deficiencies Prompt Action

In 1994, the Department of Defense established the ACTD process to exploit mature technologies and improve rapid-response rates for urgent military requirements. From its inception, the ACTD process was designed so that the end user – the warfighter – could evaluate proposed technological solutions to military needs earlier in the acquisition life cycle.

In FY97, DoD established the Joint Army and Marine Corps MOUT-ACTD, to address the most pressing deficiencies facing our troops in a MOUT environment. After a thorough review, identified deficiencies were then translated into 32 operational requirements agreed upon by the Army and Marine Corps. Covering a broad range, the resultant requirements addressed deficiencies in several areas: intelligence collection and dissemination; virtual mission planning; providing a stand-off breaching capability; the need for a blunt training round; as well as the need for more effective personnel restraints and casualty evacuation. These requirements were derived from operational deficiencies experienced by sol-

diers and Marines in past MOUT operations in Grenada, Panama, Somalia, and Haiti. With troops currently deployed to Bosnia and Kosovo, resolutions of these deficiencies are as critical today as they were in past conflicts.

Force-on-Force Experiments

The MOUT-ACTD objective is to improve a unit's tactical capabilities to dominate the MOUT environment. Accordingly, the MOUT-ACTD Program Team designed this ongoing ACTD to assess the military utility of emerging technologies combined with supporting tactics, techniques, and procedures. When placed in the hands of soldiers and Marines, these technical capabilities should increase their Command, Control, Communications, Computers, and Intelligence (C4I) engagement, force protection, and mobility.

Arguably, the key to a successful transition of any of these products into the acquisition process will be the thoroughness of the technical and operational assessments. To provide the supporting data for this assessment, the MOUT-ACTD Program Manager scheduled a series of 10 force-on-force experiments, which focused on establishing military utility of the individual technology candidates at the squad- and platoon-levels. The Army conducted six force-on-force experiments at Fort Benning, Ga., while the Marine Corps conducted four at Camp Lejeune, N.C. (Figure 1).

The best candidate technologies were selected from the 10 experiments; these selected technologies then underwent further experimentation at the company- and battalion-levels during the Joint Experiments. Those technologies demonstrating operational utility during the Joint Experiments will be integrated into the Culminating Demonstration, followed by a two-year Extended User Evaluation.

While the Joint Experiments and Culminating Demonstration focus on the operational utility of the integrated technology package, many candidate technologies are stand-alone products. These stand-alone products are expected to transition as individual technology solutions for specific user requirements. Such transition could include a combination of several initiatives: a streamlined acquisition process; nomination for the Warfighter Rapid Acquisition Program; inclusion into the Soldier Enhancement Program and the Marine Corps Enhancement Program; or placement on the General Services Administration schedule.

Participating Organizations

The U.S. Army Training and Doctrine Command is the lead executing agency. The MOUT-ACTD Technology Program Office (TPO), U.S. Army Soldier and Biological Chemical Command, is responsible for program management function, while the U.S. Army Dismounted Battlespace Battle Lab and the Marine Corps Warfighting Lab oversee the planning and execution of the ACTD field experiments. The Experimental Forces were drawn from the 10th Mountain Division, XVIII Airborne Corps, and the 2nd Marine Division, II Marine Expeditionary Force (II MEF), Marine Forces Atlantic. The Opposing Force included a mix of Army and Marine Corps infantry units.

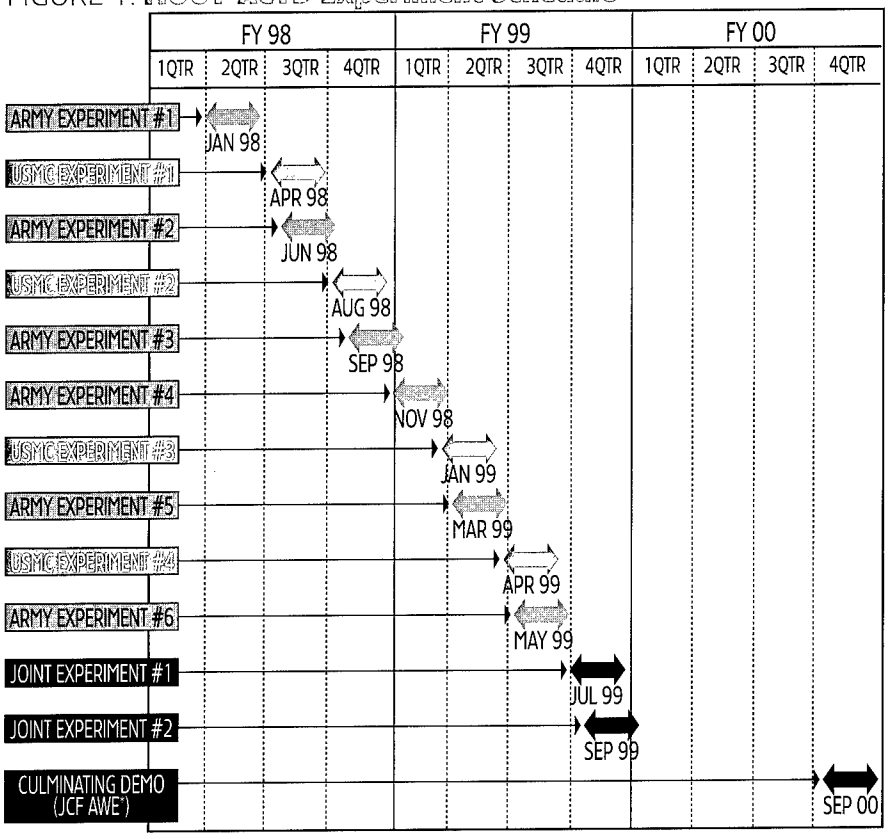
ATEC'S Responsibilities

Our ATEC System Team (AST) was comprised of evaluators, analysts, and technicians from the Army Evaluation Center, the Operational Test Command, and the Infantry Test and Evaluation Coordination Office. As members of AST, our responsibilities were to observe all MOUT experimentation activities and provide technical advice in experimental design and data collection. Additionally, we provided an independent assessment report for each of the 10 MOUT experiments, along with an integrated assessment at conclusion. Currently, our Team is preparing the Joint Experiment Assessment Report, and an additional report will be submitted following the Culminating Demonstration.

Assessment Opportunities

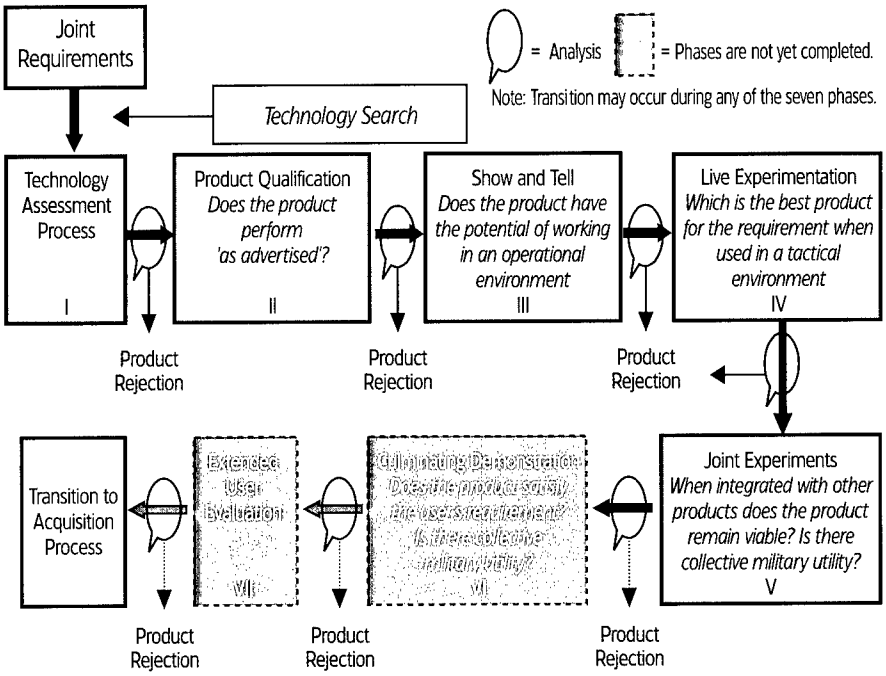
The assessment process will occur in seven phases. To date, the MOUT-ACTD

FIGURE 1. MOUT-ACTD Experiment Schedule



* Two-year extended user evaluation period following culminating demo, Joint Contingency Force Advanced Warfighting Experiment (JCF-AWE) from OCT 00 to OCT 02.

FIGURE 2. Vertical Experimentation Assessment Methodology



Program Team has completed five of these phases (Figure 2):

Phase I
Technology Assessment Process

The Technology Assessment Process, which exploited commercial, multi-attribute decision support software, was a systematic, consistent, and objective method used to assess the relative value-added of the technology candidates for each individual requirement, resulting in a ranking of those candidates. The rank order of the technology products resulted from user-defined and -weighted criteria.

Phase II
Product Qualification

Entering Phase II, the MOUT-ACTD Program Team designed the product qualification process to assess whether commercial and government off-the-shelf technologies would perform as advertised. Initially, the TPO evaluated each technology to determine whether a candidate met the minimum standards established by the Technology Assessment Process criteria. Eliminated from further experimentation were candidates that did not have a performance index within 10 percent of the candidate with the highest performance index. Considered viable candidates, those technologies remaining were selected to participate in Phase III.

Phase III
"Show and Tell" Operational Performance

Prior to each of the 10 Phase IV experiments, personnel from the Dismounted Battlespace Battle Lab or Marine Corps Warfighting Lab conducted a qualified assessment of the candidates to determine if the candidate was operationally viable.

Phase IV
Live Experimentation

Each of the 10 experiments focused on gathering technical and operational insights from side tests and tactical vignettes. Each experiment included several technical side tests that were non-tactical in nature. These were intended to focus solely on the technical performance characteristics of each technology that were otherwise difficult to evaluate as part of a tactical scenario. The side test provided a side-by-side comparison of each technology under similar conditions.

Each experiment also included several tactical vignettes, using tactical scenarios to evaluate each individual technology against the baseline technology. These vignettes provided operational data to assess the technology's effectiveness within a tactical framework.

Phase V
Joint Experiments

During the Joint Experiments' force-on-force scenarios, ATEC evaluated the tactical interoperability of the integrated technology package against baseline technologies. These experiments provided operational data to assess the technology's effectiveness as part of a package within a tactical framework. ATEC relied on user comments to determine if these technologies improve the unit's C4I, engagement, force protection, and mobility.

Phase VI
Culminating Demonstration

The MOUT-ACTD Program Team will conduct a battalion-level Joint Army/Marine Corps Culminating Demonstration in conjunction with the Joint Contingency Force Advanced Warfighting Experiment in September 2000 at the Joint Readiness Training Center, located at Fort Polk, La. The purpose of this demonstration is to confirm the overall operational utility of the integrated technology package from the Joint Experiments.

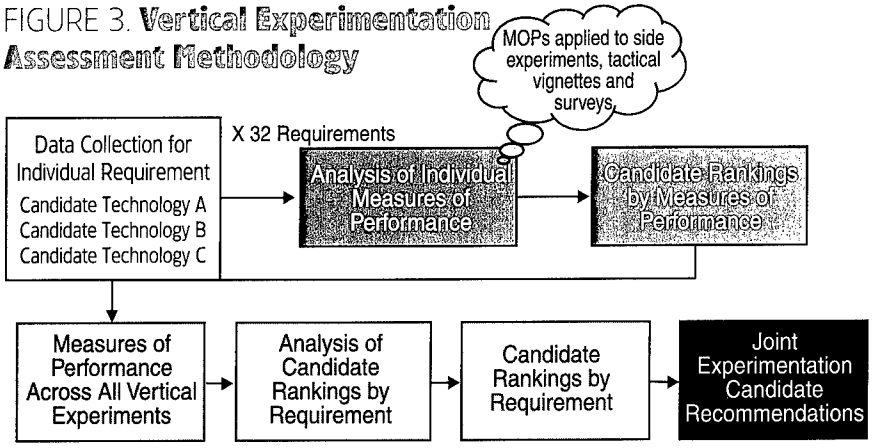
Phase VII
Extended User Evaluation

The technologies demonstrating significant military utility during the Culminating Demonstration will constitute a residual package and remain with the Experimental Force for a two-year Extended User Evaluation. Designed to provide the Experimental Force with an interim operational capability with associated tactics, techniques, and procedures, this phase will also provide some additional data collection and assessment opportunities to support the technology transition.

ATEC Assessment Methodology

During various stages of the assessment process, ATEC used different types of measurements. The following discussion provides an overview of our as-

FIGURE 3. **Vertical Experimentation Assessment Methodology**



sessment methodology during the vertical and joint experiments.

Vertical Experiment Assessment Methodology

The 10 vertical experiments focused on finding the technology candidate that best satisfied a given requirement. The data analyzed from the 10 experiments consisted of quantitative and qualitative data from surveys, side tests, and tactical vignettes Figure 3 summarizes the assessment methodology for the vertical experiments and their integration.

The analysis from each vertical experiment resulted in a ranking of each candidate technology for each measure of performance. Tabulating cumulative rankings for each of the candidates across all measures of performance, we used the results to conduct an integrated analysis of all the candidates, by requirement. Using this data, we then conducted Correspondence Analyses, calculating the high-level figures of merit for each candidate, by requirement. The analysis results, along with common sense and sound military judgment led to candidate recommendations of the most suitable technologies for inclusion in the Joint Experiments. These recommendations provided the nucleus for the MOUT-ACTD Integrated Technology Package.

Joint Experiment Assessment Methodology

While the previous 10 experiments focused on finding the technology candidate that best suited a given requirement, the Joint Experiments assessed the MOUT-ACTD Integrated Technology Package as a whole. As such, the analysis focused on three measures of effectiveness for each of four mission functional areas:

- Engagement
- Force Protection
- C4I
- Mobility.

The three measures of effectiveness included:

- Technology Functions
- Technology Package Essential Elements of Analysis
- Technology Package Measures of Outcome.

The technology functions analysis focused on an individual candidate technology's capability and military utility, as perceived by the user. The analysis of the technology packages focused on enhancement and utility, relative to the essential elements of analysis and measures of outcome as perceived by the users and observers/controllers. Figure 4 further summarizes the analysis methodology for the Joint Experimentation.

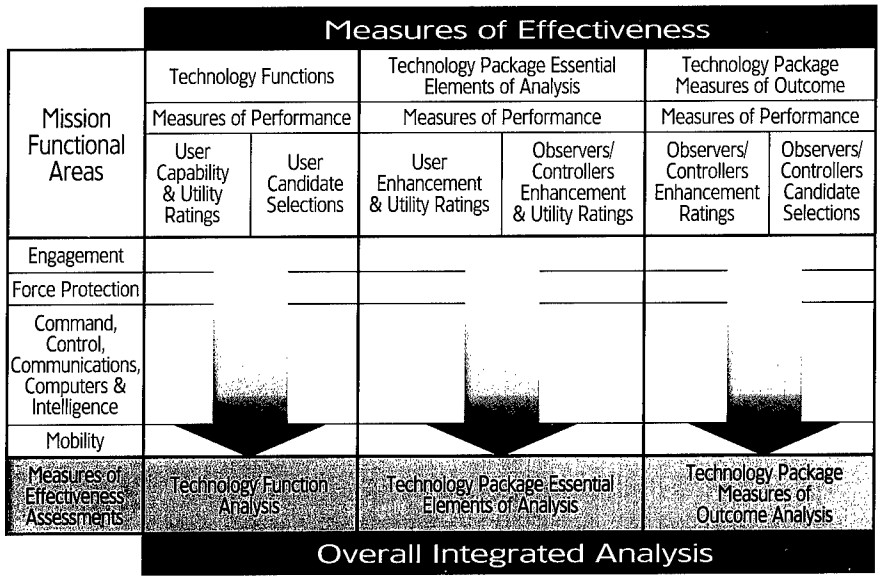
ATEC's Recommendations

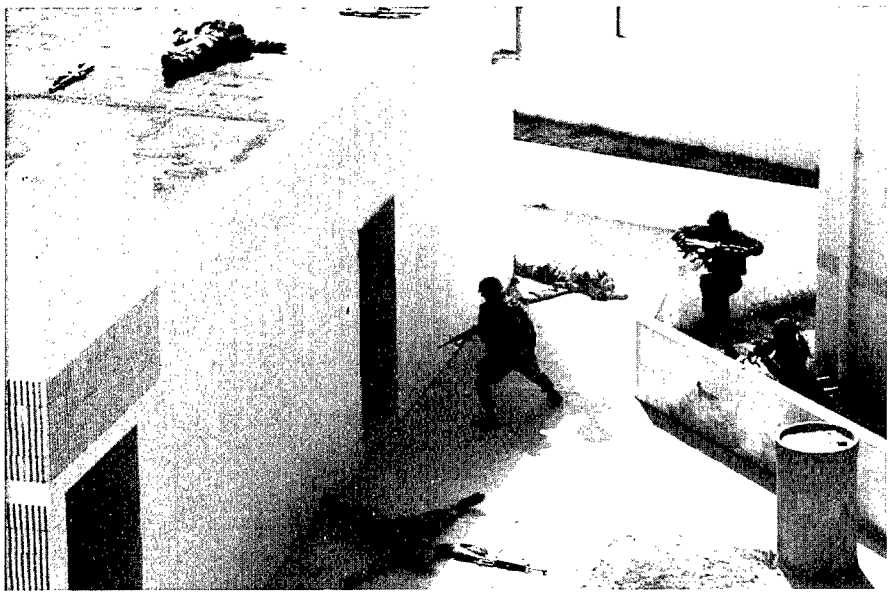
The MOUT-ACTD TPO initially assessed over 500 technology candidates against the 32 MOUT-ACTD joint requirements as part of the Technology Assessment Process. They recommended over 230 candidates to participate in the "show and tell"; user representatives then selected 118 technology candidates for the 10 vertical experiments. During the experiments, the TPO evaluated the technology candidates on their ability to satisfy 24 requirements. Based on the results, they ultimately recommended 26 technologies – satisfying 19 requirements – to participate in the Joint Experiments. Figure 5 highlights the results of the down-selection process.

Insights

Surviving its initial growing pains, the MOUT-ACTD, as with all programs, has enjoyed and will continue to reach for its share of successes. Key to our successes to date, we believe, are a number of actions the ACTD Program Manager can take to smooth the ACTD process:

FIGURE 4. **Joint Experimentation Analysis Methodology**





U.S. Marines attack role-playing terrorists during a tactical maneuver demonstration at the Military Operations in Urban Terrain facility, Camp Lejeune, N.C.

DoD photo by Marine Lance Cpl. Timothy A. Pope

Bridging the gap between mission and capabilities is the Military Operations in Urban Terrain Advanced Concept Technology Demonstration (MOUT-ACTD), which has proven and is still proving its worth as a beneficial partnership among developers, users, testers, and evaluators.

Clearly Define Requirements Early On

In general, ACTD requirements are evolutionary in nature, and the MOUT-ACTD was no exception. The ACTD process is designed so that, as insights and additional data are collected, the combat developer can refine requirements. This ensures the operational requirements document represents what the user needs, based on what has been effectively demonstrated.

Throughout the 10 experiments, there were several requirements that were not clearly defined, hampering the candidate selection and assessment process. The requirements definition process has always been a challenge. Clear, concise, and unambiguous requirement statements that define the deficiency are critical to the ATEC assessment process.

Defining the "user" requirements is critical to the acquisition process. Given this, the "user" deserves to know – early on in the process – ambiguous requirement statements may weaken the ability to accurately evaluate the system. To alleviate this problem, the combat developer (the user's representative), and the test and evaluation community, should play an active role throughout the ACTD process. The combat developer's active participation facilitates open discussion and clarification of the users' requirements essential for post-ACTD transition. This not only focuses the testing community on the users' needs, but also expedites development of the operational requirements documents needed to transition these products to the acquisition process.

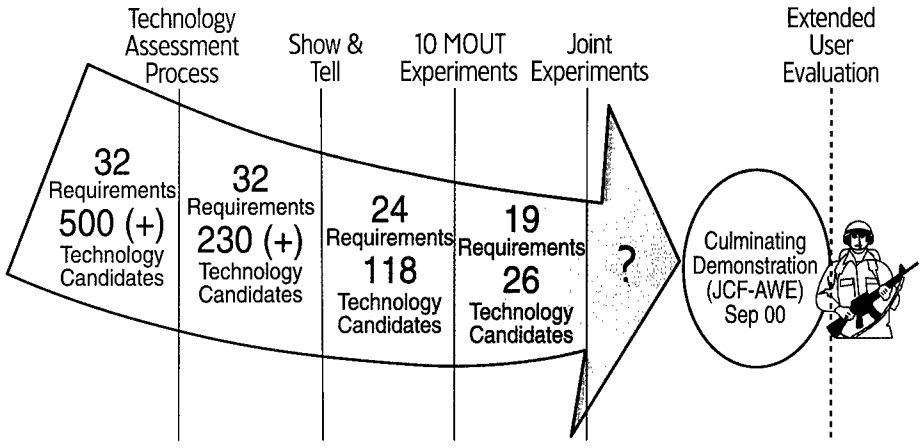
Advantage of Multiple Experiments

The multiple experiments scheduled were the strength of the MOUT-ACTD program. With each experiment, the MOUT-ACTD Team grew in experience and better applied lessons learned from previous experiments to the next. As the team matured, the members grew increasingly focused on the key issues of each requirement. This, in turn, led to more focused "show and tells," side experiments, and tactical vignettes. Over the course of these experiments, the team not only grew increasingly focused on the experiment's objectives, but also improved their capacity to analyze a course of action, develop solutions, and execute the subsequent experiments successfully.

Good Idea Cutoff Date

As the Joint Experiments started, the MOUT-ACTD Program Team allowed introduction of several new technologies

FIGURE 5. MOUT-ACTD Down-Selection Results



not present in the vertical experiments. While the 10 vertical experiments provided the structure necessary to evaluate the technical capabilities of a system or concept for the initial candidates, this was not possible with the new candidates.

While the users clearly endorsed some of these new candidates, the experimental data needed to support a fully integrated analysis were limited at best. Bringing these candidates into the process earlier would have eliminated this situation.

This late introduction of upgraded technologies into a situation or experiment is common throughout the testing community. As program managers strive to balance cost, schedule, and performance, they must first establish a good idea cutoff date. If a new product is to be brought forward after that date, the ramifications of that action must be evaluated in total. From our perspective, the decision to allow the introduction of new products into the Joint Experiments may ultimately shortchange the individual soldier or Marine "user" in the long run unless some mechanism emerges to obtain additional data supporting an integrated analysis. These candidates were not evaluated head-to-head against the baseline or other technology candidates; therefore, the final integrated analysis is not, in fact, a fully integrated analysis.

Transition to the Acquisition Process

The MOUT-ACTD has provided an excellent transition mechanism for the Army and the Marine Corps to expedite their respective acquisition processes. During the 10 experiments, the MOUT-ACTD TPO evaluated over 118 technology candidates to satisfy 24 joint user requirements. While many of these candidates were not selected, 19 requirements were satisfied through this process, and the Department of the Army approved one technology candidate as a Warfighter Rapid Acquisition Program candidate. To improve technology and focus future testing, the team made additional recommendations for the 13 remaining requirements. In the long run, this will expedite the acquisition process for the 13 unsatisfied user requirements by eliminating much of the legwork for the Concept Exploration (Phase 0), and Program Definition and Risk Reduction (Phase 1).

Transition to the Test and Evaluation Process

The data collected and assessments made during this ACTD will reduce future developmental and operational test costs. ATEC provided necessary support to the Combat Developer and Program Manager through the recommendations based on a candidate technology's ability to satisfy a given requirement and its technical maturity. The early soldier feedback, supported by ATEC's Assessment, will assist future ACTD Program Managers' efforts in recommending their systems for one of the following decisions: return for further development (government or commercial); discard the system; enter the Extended User Evaluation Period; or commercial procurement.

Final Thought

Over the past decade and continuing today, declining budgets, changing threats, and the acceleration in the pace of technology development pose significant challenges for the acquisition community and its ability to provide technological solutions for the warfighter. While we do not presume the ACTD process is a panacea for all challenges facing the acquisition community today, from both an experimental and management perspective we believe the insights highlighted in this article do indeed provide significant value-added for future ACTD Program Managers, Material Developers, and the Battle Labs as they enter their own ACTD process. Clearly, the ACTD process is on the right path.

Editor's Note: The authors welcome questions and comments on this article. Contact McVeigh or Ryan at (703) 681-9166. Or E-mail Ryan at **ryanmike@hq.atec.army.mil.**

1999 Top 100 Contractors Report Released

The Department of Defense announced today [Feb. 15, 2000] that the fiscal year 1999 report of "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards (Top 100)" is now available on the World Wide Web. The Web site address for locating this publication and other DoD contract statistics is:

http://web1.whs.osd.mil/peidhome/procstat/p01/fy1999/top100.htm

According to the new report, the top 10 defense contractors for fiscal 1999 were:

		($ in billions)
1.	Lockheed Martin Corp.	2.7
2.	The Boeing Co.	11.6
3.	Raytheon Corp.	6.4
4.	General Dynamics Corp.	4.6
5.	Northrop Grumman Corp.	3.2
6.	United Technologies Corp.	2.4
7.	Litton Industries Inc.	2.1
8.	General Electric Co.	1.7
9.	TRW Inc.	1.4
10.	Textron Inc.	1.4

In fiscal 1999, DoD prime contract awards totaled $125 billion; $6.9 billion more than in fiscal 1998.

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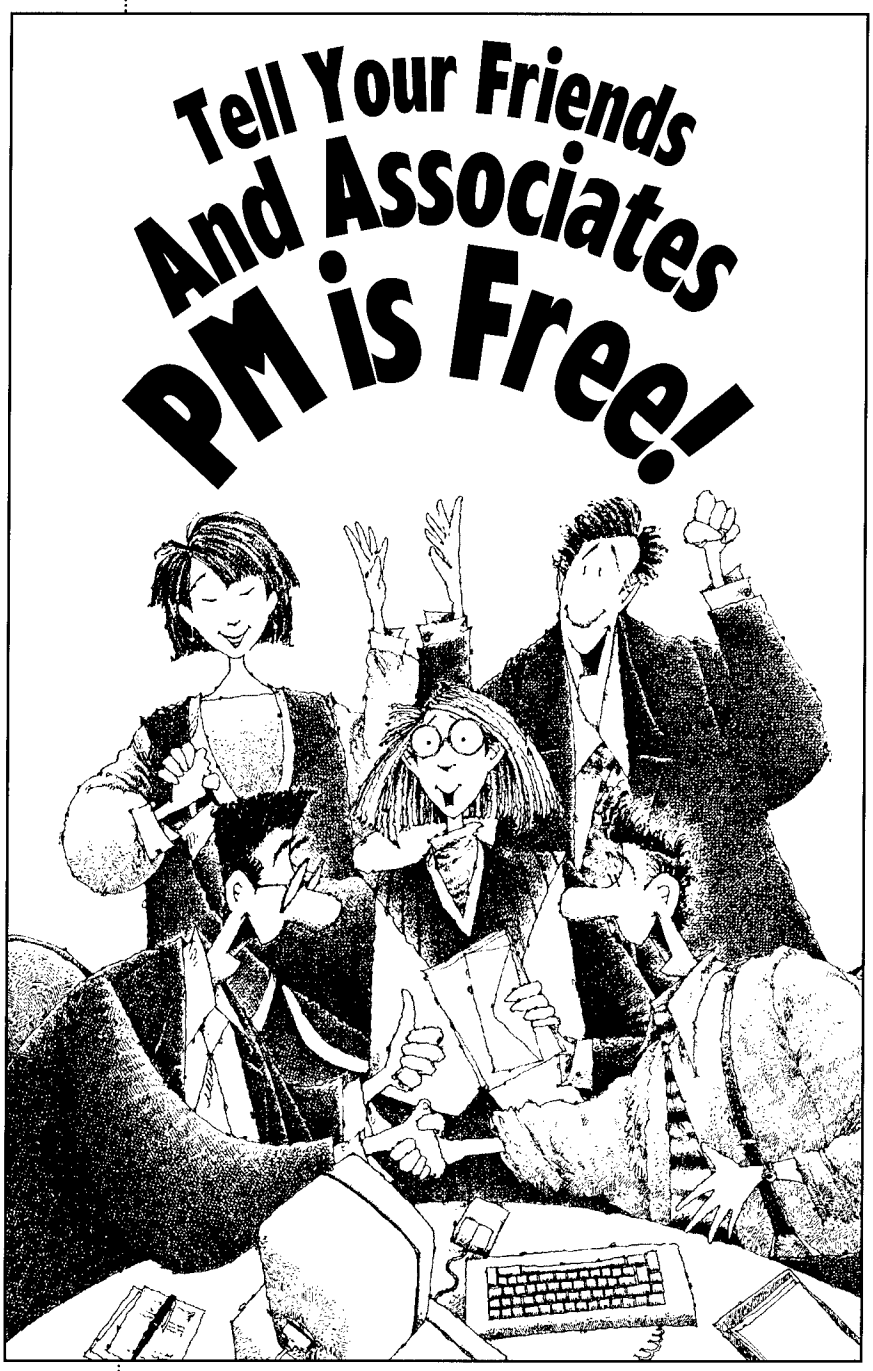

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DoD Reforms May Lack Glamour, But Not Importance

JIM GARAMONE

WASHINGTON – While the DoD budget request has finally hit the $60 billion acquisition mark, how the money would be spent is as important as how much is spent.

"DoD cannot afford to do business the old way," said Stan Soloway, Deputy Under Secretary of Defense for Acquisition Reform. "The acquisition community must mirror the changes happening to combat forces. Like them, the acquisition community must be lean, nimble, and able to capitalize on emerging technologies."

Soloway is also the Director of the Department's Defense Reform Initiative [DRI] effort. He is quick to say the two efforts have not merged.

"The Defense Reform Initiative office has a small staff, but it is separate from acquisition reform," he said. "This allows us to cross-pollinate a bit to leverage off the skills of each other, because acquisition and logistics reforms are a huge piece of the DRI."

Neither the Defense Reform Initiative nor acquisition reform has been in the news much, but this does not mean they are unimportant. "The chore of implementing or institutionalizing this stuff is neither sexy nor always visible," Soloway said. "Our goal is to actually make this stick, to make these changes real."

The DRI made news when Defense Secretary William S. Cohen announced it, but DoD officials today are not making new announcements. Instead, acquisition personnel are working on the methods, procedures, and processes they need to make reforms work.

"When acquisition reform started and the DRI came out, one thing the DoD leadership did not want to have is another fancy little report that went on the shelf," Soloway said. "That's why we are so focused on long-term performance measures."

Some of the major acquisition reforms officials are examining include paperless contracting, reinventing the travel card system, increasing use of the government purchase card, organizational streamlining, public/private competitions, and transforming logistics.

Making change happen is the charter. Acquisition reform is focusing on working with and tracking the progress of the components responsible for the major defense directives.

"We are continually updating our information and data," Soloway said. "The components responsible for the major directives have a monthly routine review – it's often with me, but also with [then] Deputy Defense Secretary John Hamre. This office is the front office's eyes and ears on the progress in the directives."

"The DRI and acquisition reform are looking to ensure the Department uses the right kind of performance measures and metrics for the directives," he said. "You can take an organizational directive and say, 'You will reduce the Office of the Secretary of Defense by 1,000 people' and when it's done, it's done," Soloway said. "But there are other directives not as clear cut." He pointed to directives dealing with logistics reform.

"We've always assumed the logistics response time is the correct measurement and by reducing the response time we would be fulfilling the directive," he said. "Now, logistics teams and experts are

IMMEDIATE RELEASE Feb. 15, 2000

working on a strategic plan, and what emerges from their studies is that the real metric is something called 'customer wait time'—how long it takes for the customer to receive the part."

Another area receiving a lot of attention is electronic commerce. "If we're really going to move into this E-business world, there are a number of issues we need to get our arms around," Soloway said. "The best way to do this is to talk to the industries."

He said DoD hosted a meeting in May 1999 split evenly between government and industry to try to identify key issues in electronic commerce such as common processes, common standards, and information assurance. From that meeting grew four working groups operating under the joint sponsorship of Soloway's office and the Assistant Secretary of Defense for Command, Control, Communications and Intelligence.

"These groups come in every six weeks and meet and tell us where they are going," he said. These groups ultimately are expected to recommend ways for DoD to facilitate E-business.

"DoD must learn to deal with the challenges of information technology, Soloway said. "Information technology in business processes is really driving the changes in the industry today," he said. "We're not just talking E-mail or an electronic mall. We're talking about fully integrated enterprises, to the point where a chief executive officer at some of these companies could press a button and see virtually every piece of information he wants—sales, human resources, energy, performance, you name it."

Developing this type of capability is a massive undertaking, and DoD is taking lessons from industry. "We organized a group of 15 very senior folks from various commands and activities, and I took them to Federal Express," Soloway said. "We spent a day with their top technology and management people just talking about this. We went to hear about what they went through from a customer perspective—what are the keys, what were their acquisition strategies, what pitfalls they encountered.

"We need to study what industry offers. We need to learn from them, and in some cases, partner with them," Soloway said. "Then we need to share that information and make it second nature for people to embrace change."

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The Third International Acquisition/ Procurement Seminar — Pacific (IAPS-P) focuses on international acquisition practices and cooperative programs. The seminar is sponsored by defense educational and related institutions in Singapore, the United States, New Zealand, Australia, and South Korea.

The seminar will be held Sept. 18-21, at the Regent Hotel, Singapore.

Those eligible to attend are Defense Department/Ministry and defense industry employees from the five sponsoring nations, who are actively engaged in international defense acquisition programs. Other nations may participate by invitation. PACRIM nations participating in previous seminars were Canada, Japan, and Thailand.

The IAPS-P is by invitation only. Those desiring an invitation who have not attended past seminars, should submit a letter of request, on government or business letterhead, to DSMC by fax.

Visit the seminar registration Internet Web site at **http://www.dsmc.dsm.mil/international/international.htm** for additional seminar information. *Qualified participants pay a small seminar expenses charge of $50 per day.* Invitations, confirmations, and joining instructions will be issued after June 1.

In the United States, contact:

- Professor Richard Kwatnoski, Director, International Acquisition Courses, DSMC
- Sharon Boyd, Projects Specialist, DSMC
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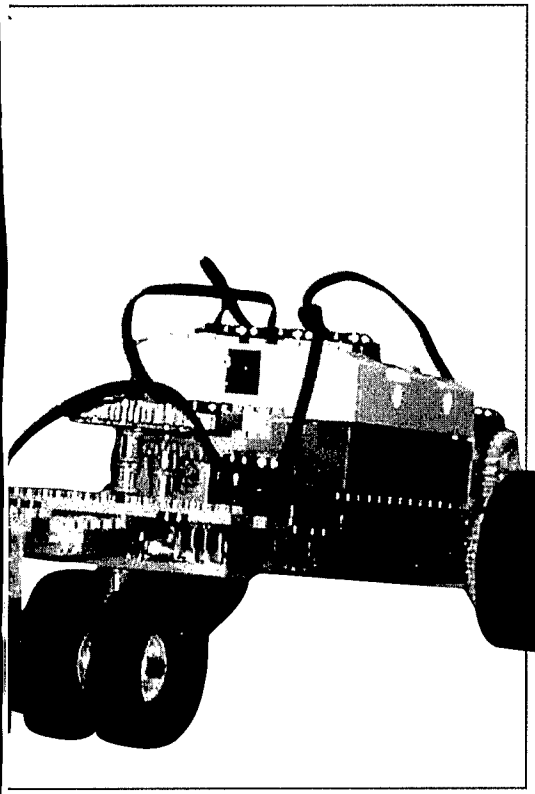
  Fax: (703) 805-3175 or DSN 655-3175

In Singapore, contact:

- Chinniah Manohara, Director Procurement, DSTA
  Comm: (+65) 373-4118/4119
  Fax: (+65) 276-2454/8443
- Ng Teck Kim, Head Corporate Administration, DSTA
  Comm: (+65) 373-6343/6336
  Fax: (+65) 373-6331

With the concurrence of the Acquisition Management Functional Board, the AMCEP IPT began a two-pronged approach to improving the APMC curriculum.

- One major effort involved the introduction of critical thinking Problem Sets (PS). These sets involve multiple functional areas and focus on Problem Based Learning (PBL). The PBL method is purposefully lacking in details and is fraught with ambiguity and complexity. The students are left wondering: 1) "What do we do now?"; and 2) "How do we do it?" This resembles what students will encounter when they return to the working environment. Therefore, case studies provide students with the lessons learned from others' "successes" and "attempts that did not work," while PBL serves as the vehicle by which the students can repeatedly practice critical thinking and problem solving in similar situations they are likely to encounter back in the working environment.



- The second major focus and the subject of this article is the improved integration of the many different functional areas taught during APMC. Because of the need for improved integration, we purposely designed the new exercise to go well beyond teaching the skills of Systems Engineering Management; it was to be an integrated acquisition exercise incorporating all functional disciplines.

While replacing the Mousetrap Exercise with something that could help improve the APMC curriculum held great promise, we took great care to identify and preserve all the elements that were responsible for past success. From the Systems Engineering perspective, the principal goal was an exercise that required students to use all the elements of the Systems Engineering Process such as balanced design through trade studies, extensive use of modeling and simulation, prudent risk taking and risk management, and configuration management.

Another challenge was creating an exercise that fits the educational needs of our diverse student population. In past surveys, some students with engineering backgrounds responded that the Mousetrap Exercise was not challenging for them. However, the purpose of the Systems Engineering Management instructional block is to train all of our students, particularly those without a technical background, in the application of principles of good technical management. Our aim is to train our students to the extent necessary to become effective program management personnel and to understand the relationships between good technical and good business management.

Responding to the need to design the curriculum for the professional engineer as well as the novice, the new project allows each student team to tailor the project to their specific learning needs. To accomplish this, we developed an Operational Requirements Document and draft Systems Specification with a broad range between the thresholds and goals. Meeting the thresholds can be accomplished with minimum difficulty. Meeting all goals simultaneously has yet to be accomplished by any team.

Finding a commercial kit to support such a project proved to be the most difficult challenge associated with development of a new project. Most educational kits are designed to be assembled into a single configuration. The new project required a commercially available kit at a reasonable cost that contained a computer microprocessor and could be assembled into multiple different configurations.

Commercial Market Survey

After conducting a commercial market survey, we chose two kits for purchase and evaluation. They were the Robotix Education Set by Learning Curve International and the Robotics Invention System by Lego. After building projects with both kits, we subsequently selected the Lego kit for use in a pilot project (beginning with one section of APMC 99-2) because of its superior computer microprocessor and easy-to-use programming language. The processor can be programmed with a language called RCX, developed at the Massachusetts Institute of Technology for training engineers in robotics. The kit also comes with an excellent interactive CD-ROM that can train an inexperienced person to program in RCX in about an hour.

As a visual language, programming with RCX is like snapping together Lego blocks on a computer screen (Figure 1). This feature solved one of the challenges of incorporating software integration, which was how to introduce software without consuming hours of valuable teaching time training students to program.

While program management personnel need to understand the technical issues surrounding software development and integration, they do not need to be/become programmers. However, for those students who are familiar with software programming and wish to explore more creative and challenging options, the processor can also be programmed in other languages such as Delphi, Visual Basic, C++, and a variety of custom lan-

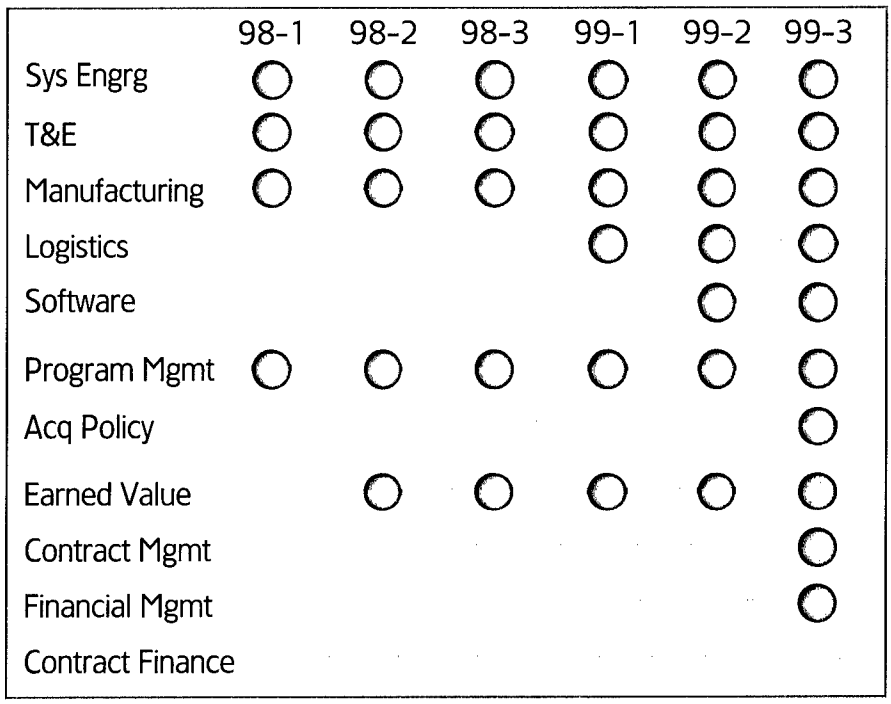


FIGURE 2. Exercise Functional Integration

design decision exercised by each student team. As a minimum, each team must demonstrate that their vehicle can be programmed to maneuver over a set course and arrive at a given point within a specified accuracy, in the event of lost communication with the control station. Students looking for a challenge may opt to develop a system that traverses a course without human assistance, including the detection and avoidance of unknown obstacles.

No matter which path the students choose, they must deal with state-of-the-art technology and real-world integration issues. Every Service is working on at least one remote control or autonomous operation vehicle, and many more will likely begin development under the future leadership of our current students.

Student Work Time

Student work time was another major consideration while developing the project. Past student critiques indicated that the Mousetrap Exercise took too many hours to complete. The addition of software to the project added 67 percent more requirements to the AUGV System Specification than the Stored Energy Ground Vehicle (SEGV). To offset the additional workload, we revised contract deliverables to remove items of marginal learning value. In addition, we developed a new, more capable Simulation Based Acquisition (SBA) software package to conduct even more of the trade studies and tests in a virtual environment.

Automated Systems Engineering Tools

Other improvements added were Automated Systems Engineering tools (such as Risk Matrix) to assist in exercises, where practical; and templates to reduce deliverable preparation time. Using the commercial off-the-shelf kit, we made additional reductions.

Students spent many hours in the hobby shop making or modifying the wood and metal parts of the SEGV project. The Lego kit consists of 750 plastic parts that can be rapidly snapped together in an almost infinite number of combinations without modification. The AUGV is designed so that the students spend a higher percentage of project hours on critical thinking and Systems Engineering Management functions as they attempt to manage multiple, conflicting, real-world demands and arrive at a balanced solution.

Functional Integration Crucial

Functional integration was one of the main reasons for changing to a different project. Figure 2 shows how the Mousetrap Exercise has been incorporating lessons and exercises from functional areas outside Systems Engineering for the last two years.. The creation of AUGV completed the integration of all functional areas in the technical block of instruction. Work is currently underway to incorporate all functional areas into the project.

Course Structure

The AUGV exercise for APMC 00-1 consists of 27 lessons and exercises covering 10 of the 11 functional areas taught. Integrating lessons from other functional areas has two distinct advantages.

- The first is a reduction in teaching cycle time. By combining the Systems

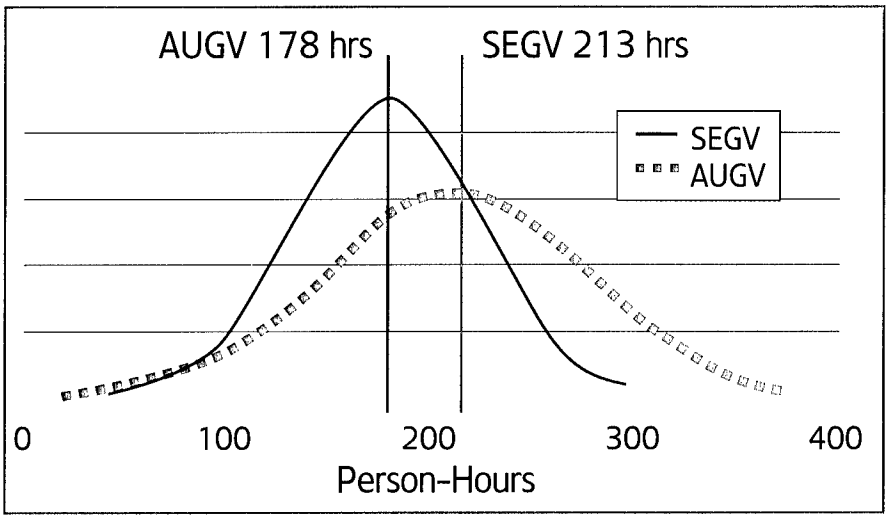


FIGURE 3. Project Hour Comparison

FIGURE 7. **GMU Students Conduct Decision Support Exercise in DSMC's Management Deliberation Center**

tion schedule ahead of the AMCEP implementation schedule, and all sections will use the AUGV in APMC 00-2 and beyond.

Cooperative Efforts

In addition to the AUGV exercise, AMCEP also experimented with cooperative learning efforts outside the college. One pilot effort had the students conduct a virtual field trip to the Pratt & Whitney (P&W) Engineering Center in West Palm Beach, Fla. Using distance learning, the AMCEP section held a video teleconference with a P&W systems engineer (Figure 6). Students gained first-hand knowledge of how industry responds to conflicting government requirements to arrive at a balanced system solution. They also gained insight into how design for producibility and design for supportability are accomplished during the functional analysis/synthesis steps of the systems engineering process.

A second pilot involved cooperative classes between DSMC and George Mason University. During the summer session, GMU students taking a Systems Engineering course taught by Dr. Ruth Buys in Decision Support and Expert Systems conducted an exercise in Group Decision Support using the DSMC Management Deliberation Center (Figure 7).

Clearly, students benefit when different schools are willing to share resources. Since most of the GMU students worked for the government, this second pilot also proved a great way for DSMC to advertise its Management Deliberation Center and other fee-for-service capabilities.

Figure 8 shows a diverse group of vehicles built by instructors as they prepare to teach the new project. Because of a rigorous training program over the summer, the Systems Engineering Department expects to have 12 fully trained instructors by fall 2000. In addition, the popularity of the Lego kit as a teaching tool has spread to numerous high schools and universities because it is an excellent, easy-to-use, low-cost teaching tool.

As we evolve and improve the project, we are able to leverage a wealth of information and work available on the Internet. Students are also encouraged to conduct their own Internet search for best practices, lessons learned, previous designs, and software programs – just as they would in a real program.

The Future

We have successfully expanded the capabilities of the baseline kit by developing our own software programmable controller units within the department (Figure 9). These units provide an option for students to integrate existing software with their concepts within an open systems environment.

Additionally, the kit – with its huge inventory of parts and highly capable computer – has excellent growth potential to support continued evolutionary project improvement and further integration of cross-functional lessons and exercises. Further, the AUGV project can be easily adapted to a spiral development technology demonstration effort to match the new draft of the DoD 5000 series when approved.

As we close out the Mousetrap at the end of APMC 00-1, a sense of loss in retiring something that has served so well

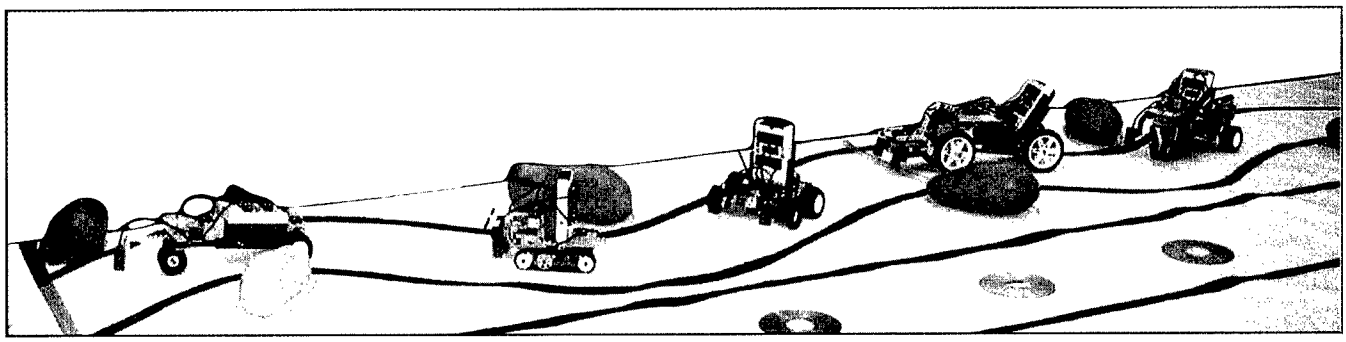


FIGURE 8. **Variety of Instructor-built AUGV Concepts**

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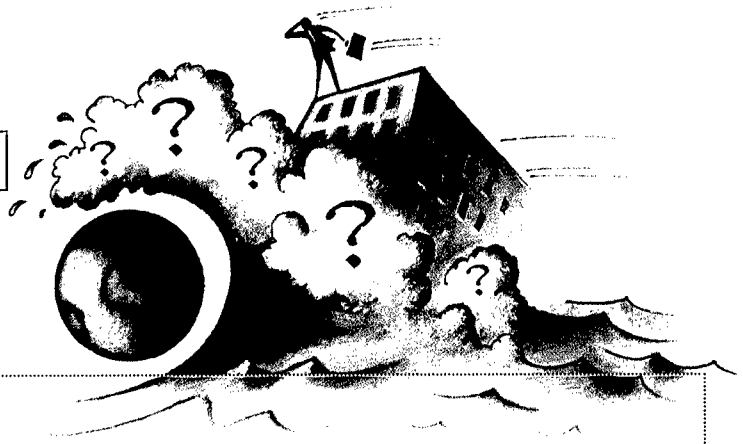

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Acquisition Systems Management
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Director, Test, Systems Engineering & Evaluation (DTSE&E), USD(A&T)
http://www.acq.osd.mil/sa/se/index.htm
Systems engineering mission; Defense Acquisition Workforce Improvement Act information, training, and related sites; information on key areas of systems engineering responsibility.

Defense Acquisition Deskbook
http://www.deskbook.osd.mil
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Defense Acquisition University and Acquisition Reform Communications Center (ARCC)
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Naval Sea Systems Command
http://www.navsea.navy.mil/sea017/toc.htm
Total Ownership Cost (TOC); documentation and policy; Reduction Plan; Implementation Timeline; TOC reporting templates; Frequently Asked Questions (FAQ).

Navy Acquisition and Business Management
http://www.abm.rda.hq.navy.mil
Policy documents; training opportunities; guides on areas such as risk management, acquisition environmental issues, past performance, and more; news and assistance for the Standardized Procurement System (SPS) community; notices of upcoming events.

Air Force (Acquisition)
http://www.safaq.hq.af.mil/
Policy; career development and training opportunities; reducing TOC; library; links.

Air Force Materiel Command (AFMC) Contracting Laboratory's Federal Acquisition Regulation (FAR) Site
http://farsite.hill.af.mil/
FAR search tool; *Commerce Business Daily* Announcements (CBDNet); *Federal Register;* Electronic Forms Library.

Defense Systems Management College (DSMC)
http://www.dsmc.dsm.mil
DSMC educational products and services; course schedules; *Program Manager* magazine and *Acquisition Review Quarterly* journal; job opportunities.

Defense Advanced Research Projects Agency (DARPA)
http://www.darpa.mil
News releases; current solicitations; "Doing Business with DARPA."

Defense Information Systems Agency (DISA)
http://www.disa.mil
Structure and mission of DISA; Defense Information System Network; Defense Message System; Global Command and Control System; much more!

National Imagery and Mapping Agency [Formerly Defense Mapping Agency (DMA)]
http://www.nima.mil
Imagery; maps and geodata; Freedom of Information Act resources; publications.

Defense Modeling and Simulation Office (DMSO)
http://www.dmso.mil
DoD Modeling and Simulation Master Plan; document library; events; services.

Defense Technical Information Center (DTIC)
http://www.dtic.mil/
Technical reports; products and services; registration with DTIC; special programs; acronyms; DTIC FAQs.

Joint Electronic Commerce Program Office (JECPO)
http://www.acq.osd.mil/ec/
Policy; newsletters; Central Contractor Registration; assistance centers; DoD Electronic Commerce Partners.

Open Systems Joint Task Force
http://www.acq.osd.mil/osjtf
Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

Government Education and Training Network (GETN) (For Department of Defense Only)
http://atn.afit.af.mil/schedule_page.htm
Schedule of distance learning opportunities.

Government-Industry Data Exchange Program (GIDEP)
http://www.gidep.corona.navy.mil
Federally funded co-op of government and industry participants that provides an electronic forum to exchange technical information essential during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.

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